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THE OPHTHALMIC RECORD

A Monthly Review of the Progress
of Ophthalmology

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INTRAOCULAR TUBERCULOSIS.*

BY

EDWARD JACKSON, M. D.

DENVER, COLO.

One whose medical work began before Koch discovered the tubercle bacillus, can trace, through all the subsequent rapid development of our knowledge of tuberculosis, the influence of the earlier teaching; hindering the understanding of what has of later years been brought to our attention, and delaying the application of extremely valuable knowledge to the management of this disease. In no direction has this unwholesome influence been more strongly felt than in the diagnosis and treatment of ocular tuberculosis.

The ophthalmologist has looked upon tuberculosis as a disease mainly outside of his special province; about which he must accept the general views of the internist and the surgeon, when it is recognized to have invaded the eye. And too often the views that he thus accepts are not those of the latest literature, but those set forth in standard text-books, when he studied medicine. In regard to a subject so rapidly developing as that of tuberculosis this gives a false point of view and develops error. So that, because of their lack of harmony with the older teachings, many of the facts recently observed with regard to tuberculosis are met with skepticism and neglect.

The work of Laennec on pulmonary tuberculosis almost one hundred years ago, made tuberculosis almost synonymous with pulmonary phthisis; and still causes many things that are true only of the pulmonic cases to be regarded as generally characteristic of the tuberculous process. Even with reference to bone tuberculosis, which has been distinctly recognized from pre-bacillary times, there is still a liability to overlook the character of the lesion because the wasting and the febrile movement that characterize phthisis may be very slight, or

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quite absent, until the terminal stage of general miliary tuberculosis, which it has in common with phthisis. There has been a strong disposition to regard with doubt the tuberculous character of eye lesions, unless tuberculous processes were at the same time evident in the lungs, bones, or lymph nodes; or some of the supposed "general symptoms" of tuberculosis, like wasting, or fever were recognized. It would be as rational to look for the bronzing of the skin that marks tuberculosis of the adrenals.

Since the discovery of the bacillus we have learned that its invasion may cause disease in any organ of the body, with a grouping of symptoms depending almost wholly on the organ involved, rather than on the common cause. This must be clearly borne in mind, if we are to understand and intelligently use the facts that are rapidly being placed on record with regard to ocular tuberculosis. It is to combat misapprehensions and to present a grouping of some of these newly observed facts that this paper is undertaken.

The first erroneous inferences arise in connection with the diagnosis of tuberculosis of the eye. Since the acceptance of the bacillus as the cause of the disease there has been a very natural disposition to rest the diagnosis on *the finding of the bacillus*. In certain lesions like the developing miliary tubercle the bacillus may be always and readily found. But in the chronic lesions it is always scarce, and may not be discovered by prolonged and skillful search. Some of our best pathologists have coupled the positive histologic diagnosis of tuberculosis, with the statement that the bacilli could not be found. Collins (Ophthalmoscope, 1907, Jan., Feb., and March) reporting on eighteen cases in which the eyeball was excised for uveal tuberculosis, at the Royal London Ophthalmic Hospital, states that in one case tubercle bacilli were found, in another their presence was doubtful, and in four cases they were looked for and not found. In one case a successful inoculation was made in the eye of a rabbit. But in fifteen cases the diagnosis seems to have rested on the symptoms, clinical course, and pathologic histology. It is experiences like this that have caused the staining and search of suspected tissues for bacilli to be ranked below inoculation tests, as a foundation for the diagnosis of tuberculosis. The failure to find bacilli in a case of chronic intraocular tuberculosis scarcely raises any question of doubt regarding the diagnosis.

A second cause of diagnostic uncertainty lies in an undue faith in *tuberculin tests*. Not that these may be safely neglected, or are devoid of great value; but that they cannot be absolutely relied on. The Calmette conjunctival reaction has been practically excluded from the diagnosis of ocular tuberculosis on account of some real danger of aggravation of the local lesions. The von Pirquet reaction often considered unreliable in adults because of its positive character in many practically healthy people, may quite fail in the other direction. I have known it to fail, when repeated, in one of the most marked cases of ocular tuberculosis, accompanied by tuberculous meningitis, the diagnosis of the latter being confirmed by operation.

The repeated injection of old tuberculin is probably the best of these tests; especially if the general reaction is accompanied by a focal reaction. But a single injection is not enough. Von Hippel reports a case (Graefe's Archiv. für Ophthalmologie, Vol. 87, p. 193) in which the enucleated eye was found full of tuberculous masses; yet the general reaction to old tuberculin was only obtained from the sixth injection containing 5 mg. Various reasons for the failure of tuberculin to excite reaction have been suggested; and among these it may be well to include the supposition, that the tuberculosis process confined to a small, somewhat isolated organ, while doing great local damage, is liable not to cause those systemic conditions on which such reactions depend.

From the time of Graefe (1855) and Manz (1858) we have descriptions of the classic forms of *choroidal tubercle*, the *granuloma* (solitary, conglobate or conglomerate) a tumor-like chronic form; and the *choroidal miliary tubercle*, both occurring with other marked tuberculous disease. The massive granuloma is rare. Many ophthalmologists in active practice will never encounter a case. The miliary tubercles of the choroid have been looked for faithfully, and not found in countless cases of evident tuberculosis.

It seems clear that these "typical" miliary tubercles are found only in tuberculous meningitis, and generalized miliary tuberculosis, as a terminal condition. They may be taken as evidence of the near approach of a fatal termination of the case. Often when closely looked for they only appear in the last few days of life, and then develop rapidly, new ones being discovered from day to day. Though they are probably common at this stage—Jessop found them post mortem in over fifty per

cent of cases (Brit. Med. Jour. Aug. 26, 1905)—they are not of great practical importance, except as they settle a doubtful diagnosis.

But appearing thus we only see these lesions in their early stage. Before they can run their course the patient dies. There is no reason to suppose that small tubercular lesions of the choroid, occurring in persons of general strength and running a course of many weeks or months to the formation of choroidal scars, continue to represent any such picture as is usually described for miliary tubercle of the choroid. In a case the writer watched through such an attack in a young and generally healthy person, the earlier appearances were quite similar to those commonly described as belonging to miliary tubercle of the choroid. But later, when swelling went down, the deeper structures were seen, pigment deposits developed, and the final appearance was that of choroidal atrophy with pigmentation. There seems every reason to accept as correct the views of Stock based on experiment (Graefe's Archiv. für Ophth. v. 66, p. 1) and of Axenfeld and others, that tuberculosis is a common cause of chronic choroiditis and choroidal atrophy.

When we come to *retinal tuberculosis* the subject is still more obscured by prejudgment based on our impressions gathered from observations of the tuberculous process in wholly different organs. Here the oft appealed to analogy between the retina and the brain may be of real service. In the retina as in the brain the lesions are closely associated with the vessels. It may be too much to assume that recurring hemorrhage into the vitreous in young persons and retinitis proliferans are always due to tuberculosis. But certainly the finding of tubercle bacilli in some of the retinal lesions, the characteristic tubercular structure in others, the general and local reactions of these patients to tuberculin injections, and the control or cure of numerous cases by tuberculin treatment, come as a revelation in a very obscure field of ocular pathology.

There are now on record a number of cases of recurring hemorrhage and of retinal phlebitis, in which the tuberculin tests have given positive results; and several in which the tuberculin treatment has been followed by cessation of the hemorrhages, clearing up of retinal opacity, return of the vessels to normal appearance, or the formation of scar tissue and a permanent relative cure. I have had two such cases under observation most of the past year. Both patients were young

women with no evident pulmonary lesions, and in fair general condition although not in robust health.

In so far as retinitis proliferans is associated with recurring hemorrhage in young patients there is a strong presumption that it is of tuberculous origin. But of course the active stage has passed and the lesions are well on the way to healing through the formation of scar tissue before the case assumes this character. The bands of tissue seen in the retina and vitreous have the same relation to the active lesion, as have connective tissue scars found in other organs.

Closely allied with the above are some of the interesting cases that have been published under the name *massive exudation into the retina*. It is certain that conditions of quite different origin and character have been brought together under this title. But some of the best studied have given the distinct evidence of a tuberculous origin and character. In this direction positive light has been thrown on a group of extremely obscure cases. Some of these grade insensibly into those earlier recognized but rarely encountered cases of massive tubercle, involving the optic nerve and retina.

Some of these cases of chronic choroidal and retinal tuberculosis occur in patients that are suffering from manifest tuberculous disease of other organs. An extremely distressing case of retinal hemorrhage into the vitreous occurred in a physician, who resided in Colorado for pulmonary tuberculosis which proved progressive and after several years fatal. I have seen choroidal hemorrhage with bone tuberculosis. But it proves a stumbling block in the diagnosis of many cases, that no evidence of tuberculosis in other organs has been recognized, or is at the time recognizable. Until tuberculosis has become advanced and general, there is a strong disposition not to admit its existence. Every doctor in the health resort region has frequent reminders of this tendency. We are still slow to accept the teaching of the most extensive statistics of post mortem examination, viz.: That the majority of all bodies that come to autopsy, some say over 90 per cent, give evidence of having at some time suffered from tuberculosis; and that in the majority of those who contract tuberculosis, the process never becomes general, but ends in the healing of the lesions.

The first case of uveal tuberculosis I ever saw, some thirty years ago, caused blindness of both eyes without positive evidence of involvement of other organs. Certainly the process

never became general, but grew gradually less active and finally extinct. The slight impairment of the patient's general health gradually passed away, and she was living twenty years afterward: perhaps is still in good health. After the eyes became permanently quiet there was slow improvement of vision, from bare light perception to a fair ability to avoid obstacles, and move about by the guidance of sight.

The liability for the function of the eye to be permanently destroyed by a pathological process, that might run its course to recovery almost or quite unnoticed in other parts of the body, makes it incumbent on ophthalmologists to take the lead in the study and management of these limited and in a sense benign manifestations of tuberculosis. We, more than any other part of the medical profession, are interested in the recognition and control of such processes; and the ophthalmoscope gives us an exceptional opportunity to study them, while impairment of vision brings such cases to us at a very early stage.

In the matter of the effects of treatment our knowledge should be more exact and reliable than that of most of our colleagues. Tuberculosis is clearly a house disease, almost unknown among men and animals that live in the open; and cured by changing from indoor to outdoor life. This seems as true of intraocular as of other manifestations of the disease. There are many cases on record of recovery under living outdoors with favorable surroundings and conditions, as in the case last mentioned. In the last year Fuchs at Vienna, and Oloff at Kiel, have both emphasized the importance of this fact. The good general condition and strength of the patient makes it comparatively easy to secure the benefits of good food and outdoor living. But it is just as important to insist on these, even including favorable climatic conditions, as it is for cases of pulmonary tuberculosis.

For the longer known and more obvious tuberculosis lesions of the eye, like parenchymatous keratitis, and iritis, it is not too much to say that the use of *tuberculin* has quite changed the prognosis of these conditions. After the therapeutic fiasco which followed Koch's premature announcement in 1890, von Hippel continued the use of tuberculin in reduced dose, and by his report of results thirteen years later, did much to bring in the new era in tuberculin therapy. The recorded experience in this direction is now large and generally favorable,

in spite of the fact that in many cases a powerful agent has been injudiciously used. I am satisfied that the tendency is to give too large doses and to repeat them too frequently. I have never advised the use of tuberculin injections more frequently than once a week, and I am convinced that in many cases this is too often. In one of the recent cases of recurring hemorrhage above referred to, the last two recurrences of retinal bleeding were each within two days after the injection of tuberculin. Since we stopped increasing the dose and lengthened the interval to two weeks the case has done better.

The tuberculin is given to produce a certain reaction in the body. Until the series of changes so produced has had time to run through its full cycle, the process should not be started anew. This is true whether we attach much or little importance to variations in the opsonic index. Something similar is seen in the effects of silver nitrate applied to the conjunctiva for ophthalmia neonatorum. Graefe early noticed it, and laid down the rule that the application should not be too frequently repeated. After a thorough application of silver nitrate it should never be repeated in less than twenty-four hours. Often it is quite as well to leave it twice as long. With tuberculin the cycle of reaction is much longer. I believe it is safer as a rule to begin with an interval of two weeks between the injections. A good many cases continue to gain and improve more rapidly for several weeks, and even months, after suspension of the tuberculin treatment.

One other point with reference to the specific treatment. It is now generally recognized that in the therapeutic use of tuberculin the dose should be kept below that which will produce a general febrile reaction. Even the slightest rise of temperature should be avoided. In the matter of intraocular tuberculosis I believe we are quite liable to have a perceptible focal reaction, when no rise of temperature or other evidence of general reaction is perceptible; and such focal reaction, marked increase of hyperemia, clouding or swelling is equally to be avoided. On this account a careful ophthalmoscopic examination should be made the day after each tuberculin injection; and when the fundus conditions are masked by haziness of the retina or vitreous, or hemorrhage into the vitreous, the dose should be kept small, and only increased slightly and at long intervals. I believe that disregard of caution in this respect is, more than anything else, responsible for the uncer-

tainty and skepticism that exist with regard to tuberculin therapy.

The essential thoughts of my paper are: That cases of tuberculosis of the choroid and retina are not rare, and occur usually in persons who seem to be in fair general health. In the observation and treatment of such cases we are doing pioneer work of great importance to our patients and to the general science of medicine. In their treatment we should avail ourselves of all that is known of the general hygienic treatment of tuberculosis; and in the specific treatment should give small doses of tuberculin at comparatively long intervals, one to four weeks.

SOME OBSERVATIONS ON OCULAR TUBERCULOSIS AND ITS TREATMENT *

BY
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Probably no disease except syphilis is as protean in its manifestations as tuberculosis and of all the tissues of the body affected by it none offers more difficulty in establishing a correct diagnosis than the eye.

Many a case of choroiditis, scleritis and keratitis has been falsely attributed to a too consistent worship of the God Venus and offered up as a sacrifice to the God Mercury. With the availability of the specific reactions for syphilis, tuberculosis and gonorrhea we are enabled in the vast majority of instances to place the responsibility where it properly belongs.

While it is undoubtedly a great help in forming a diagnosis to secure a definite history of tuberculosis in the patient or his immediate family, I am inclined to place very little value on a negative history for it is well known that over seventy per cent of all adults are or have been infected with tuberculosis.

In only three of the following nine cases was I able to satisfy myself of a positive tuberculous history and two of these were rather doubtful.

Tuberculosis may attack the eye as acute miliary tuberculosis of the choroid or conglomerate tubercle of the iris, ciliary body and choroid. What is far more common is interstitial keratitis, sclerosing keratitis, phlyctenular keratitis, episcleritis,

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deep nodular scleritis, chronic iridocyclitis and choroiditis with hyalitis.

This subject has been well covered in a very interesting paper by Dr. A. Edward Davis,* which is well worth careful study by those who use tuberculin in their practice.

To Mr. Sydney Stephenson and Dr. Geo. Carpenter of England belongs the credit for directing the attention of the profession to the tuberculous origin of many cases of choroiditis formerly thought to be syphilitic and also to the fact that choroidal tuberculosis may be and often is a manifestation of latent as well as active tuberculosis.

In the diagnosis of tuberculosis of the eye it seems to be the consensus of opinion that of all the tests recommended and used for this purpose the subcutaneous injection of old tuberculin is by far the most reliable. In view of the dangers attendant upon the use of the Calmette ophthalmo-reaction and the fact that a combination of the Von Pirquet and subcutaneous injection methods of diagnosis when properly used are harmless and thoroughly reliable, the former method has been discarded by most clinicians.

In children under ten years the cutaneous test of Von Pirquet is fairly reliable and being a simple one and much more easily carried out than the subcutaneous test, is usually preferred by most clinicians, especially those who see a large number of cases in the out-patient departments of our hospitals.

A general reaction to the subcutaneous injection of old tuberculin as evidenced by a feeling of malaise and a rise in temperature by no means determines the tuberculous nature of the ocular disease. To establish this to a certainty it is necessary in addition to the general reaction to secure a focal one as well. This is not always possible, for there are instances where the deeper structures of the eye,—the choroid and optic nerve, are the seat of a tuberculous process in which it is extremely difficult to secure any evidence of a focal reaction. I am inclined to believe that, where you have an inflammation of an eye of obscure origin in which the patient responds positively to the subcutaneous injection both locally and generally but not focally and in whom, after a careful examination, it is impossible to determine the presence of inflammation

*Transactions of the Section on Ophthalmology, A. M. A., 1913.

in any other part of the body but the eye, and, in whom syphilis, gonorrhea, accessory sinus disease, carious teeth and infected tonsils, have been eliminated, it is certainly fair to assume that the infection in the eye is tuberculosis. It seems to me, therefore, that in view of these facts we are justified in giving the patient the benefit of the doubt, and instituting a course of tuberculin treatment at once.

In writing of the several kinds of reactions I have noticed that some writers are inclined to be a little vague in defining local and focal reactions. The local reaction is the one encountered at the seat of the injection while the focal reaction is seen in the eye itself.

In the treatment of these cases I have used Bacillen Emulsion in most of them, starting with 1/10000 of mg. and gradually increasing the dose, trying always to avoid a reaction. The intervals between injections varying from two to three days to a week. Haste has no place in the use of tuberculin for ocular tuberculosis.

By increasing the dose too rapidly or decreasing the intervals between the injections it is possible to bring about such a severe focal reaction as to jeopardize the integrity of the eye.

Of the following cases all are examples of tuberculous disease of the anterior ocular segment except one; the exception is a case of probable choroidal tuberculosis with secondary hyalitis.

Tuberculous Conjunctivitis. (Hypertrophic)

Case 1. *Mr. M. Mc.* Age 22. Referred for treatment of an inflammation of the lids of the right eye of obscure origin. History: The personal and family history of the patient is negative. No history of tuberculosis on either side of the family. He first noticed that the palpebral conjunctiva of the lids of the right eye was red and swollen and that the lower lid was thickened more than its fellow of the opposite side.

Examination: The nose save for some engorgement of the turbinals on the same side was normal. The teeth were in good condition showing no evidence of any source of focal infection; nor was there any evidence of disease of the tonsils. Bowel habits regular.

The examination of the right lids showed a very well marked thickening of the palpebral conjunctiva, more pronounced on the lower lid, extending from the junction of the

middle and outer third to the external canthus. The thickening of the lower lid over this area prevented the nice approximation of the lid margin to the globe as in the normal eye. The thickening and induration extended not only to the free margin of the outer third of the upper lid but also on the skin surface for a distance of one-quarter of an inch external to the canthus. This area was much roughened and excoriated but not ulcerated. On the lower lid at the junction of the lid margin and the skin in the diseased area there was a small round yellowish white nodule about 3 mm. in diameter. This the patient said had been present some time before the lids became actively inflamed.

On the palpebral conjunctiva on both upper and lower lids over the diseased area in addition to the redness and induration were to be seen numerous small round trachoma-like follicles. These were localized on the outer third of the conjunctiva and were absent on the bulbar portion of this membrane, although this was intensely congested. There was no involvement of the eye itself.

Treatment: Believing that the process might be trachomatous, the lids were rolled but with absolutely no improvement. Tuberculosis was suspected and a Von Pirquet test was made with a positive result. He was given a subcutaneous injection of tuberculin to which he responded with a local, focal and general reaction.

The first therapeutic injection was 1/2000 mg. T. R. This was followed by three injections of 1/1000 mg. T. R. at weekly intervals. Two more weekly injections of 1/500 mg. T. R. followed. Improvement became apparent after the second injection and after the third the small yellowish nodule had disappeared. The thickening of the lids melted away and today after a lapse of a year and a half absolutely no trace of the disease remains.

Blepharitis and Phlyctenular Kerato-Conjunctivitis.

Case 2. *Mrs. X.* Age not known. Was seen while the writer was connected with the Samaritan Hospital, Philadelphia, and the history of the case has been forgotten.

Examination: In this case there was a very definite thickening of the outer third of both the upper and lower lids of the right eye with marked excoriation of the skin extending to the outer canthus. The inflammation spread to the bulbar conjunctiva and there was an exceptionally large yellowish

white mass situated just external to the temporal limbus. There are several points about this case, among the many that have been forgotten, which come to mind. The case was considered to be one of severe phlyctenular disease and it probably was; there was no nasal abnormality which could have been considered as a contributing cause of the disease; all the accepted remedies had been tried without making any impression on the disease, and finally the use of tuberculin injections caused the rapid disappearance of the phlyctenule and a complete restoration of the lids to normal.

It seems fair to assume from the rapid response to tuberculin injections that the disease was of a tuberculous nature.

Tuberculous Keratitis. (Nodular)

Case 3. *Miss C. A. H.* Age 30. Trained nurse, was referred to me for the diagnosis and treatment of an acutely inflamed eye. History: The patient says that three years ago she had her left eye infected but is not able to say whether it was gonorrheal or not. From old scars on the cornea it seems most likely to have been phlyctenular disease, for a younger sister who is also a patient of the writer's has marked irregular astigmatism from scarring on both corneae, probably of similar origin.

Examination: Pain radiating over forehead and same side of the head, lacrimation and intense photophobia. With binocular loupe the substantia propria of the cornea was seen to be the seat of diffuse infiltration with a few nodules scattered throughout the membrane. These could easily be distinguished from the old scars on the surface. There was some pericorneal injection where one or two of the areas of infiltration approached the limbus. The cornea did not take the fluorescein stain. No involvement of the iris.

Diagnosis: Von Pirquet test positive. Subcutaneous injection caused general, local and focal reaction.

Treatment: Injection B. E. (Cutter's) 1/5000 mg. repeated in one week. This dose was gradually increased for three more injections given at weekly intervals.

The patient was very much improved not only subjectively but objectively as well and being very desirous of returning to her home in Vancouver, B. C., I allowed her to go and referred her to a colleague in that city, asking him to continue the same treatment until in his judgment the patient might be considered cured.

It is interesting to note that after the second injection

the pain was very greatly relieved and rapidly disappeared thereafter.

Tuberculous Scleritis and Sclero-Keratitis.

Case 4. *Mr. O. L.* Age 28. Laborer, has been suffering with a severe inflammation of the right eye for the last two months. History: So far as he is able to say he has always enjoyed good health, although eight or nine years ago the left eye became inflamed. He can tell very little about the condition of this eye at that time other than that it became inflamed and his vision greatly impaired. After the subsidence of the inflammation he was taken to the hospital and an operation performed for the purpose of cutting out a piece of the iris. He remembers hearing the doctor say that it was "scrofula."

This eye today shows the scar of the operative wound and an adherence of the iris to the wound edges, giving rise to an oval shaped pupil, long axis transverse. Just above the limbus in the vertical meridian there is a bluish ectatic area about the size of a small pea. Vitreous is filled with exudate. Vision equals light perception.

Examination: The right eye is the seat of a localized area of scleral inflammation adjacent to the cornea at the external limbus. From this area numerous deep seated blood vessels extend into the substantia propria of the cornea. These are surrounded by a dense infiltrate triangular in shape, the whole resembling very much the salmon patch of hereditary syphilis for which it was at first mistaken. There was some slight pericorneal injection other than this area described but no involvement of the iris.

Diagnosis and treatment: A Wassermann test was negative. A Von Pirquet was positive and both a local and focal reaction was obtained from a subcutaneous injection of tuberculin. A therapeutic injection of B. E. 1/5000 mg. This was gradually increased to 1/500 mg. at weekly intervals. During this time there was a fresh outbreak of the disease dangerously near the pupillary area but this subsided before much damage had been done. After two months the eye began to show improvement and has gradually cleared so that today, after a lapse of eight months, the eye is absolutely quiet and although there is some opacity remaining the corrected vision equals 5/5 partly.

Tuberculous Scleritis and Sclero-Keratitis.

Case 5. *Miss A. E.* Age 21. Clerk, referred by family physician, with history that patient needed treatment for a badly inflamed left eye.

History: Family physician reports that one Fallopian tube was removed six months previously and found to be tuberculous. Patient says left eye began to bother her about six weeks ago. Examination: There was a small bluish red, very painful nodule just external to the limbus on the temporal side of the left eye, between the insertion of the external rectus and the limbus. Bulbar conjunctiva over the nodule greatly congested. Eye is very painful but worse in morning, no photophobia, some lacrimation. Says eye burns. Some blepharitis marginalis. Pupils normal in size and react promptly to light, accommodation and convergence. The cervical glands on the homolateral side were as large collectively as a goose egg but showed no tendency to break down. Diagnosis was obvious in view of her history, and the injections were immediately begun. First one given at 2 p. m. produced a rise in temperature that evening. This patient was given weekly injection of B. E. starting with 1/5000 mg. for six weeks before eye began to show any improvement. The dose was gradually increased until she was taking 1/1000 mg. The increase was gradual in this case, for the eye reacted readily and it was thought best to "make haste slowly."

Before starting the tuberculin injections I advised her and her physician to have the glands in her neck thoroughly enucleated but for some reason this was not done. After six weeks' treatment with tuberculin she began to improve, although to her this was not apparent.

She passed from my care and consulted a physician who makes a specialty of tuberculin therapy in general tuberculosis, who in turn referred her to another ophthalmic surgeon. I learned later from the latter that aside from atropine and dionin, she received no other treatment from him. I have reason to believe, however, that she was receiving injections of tuberculin regularly.

In passing I may say that the patient in conversation with me after she had ceased to be under my care told me that the physician who was administering tuberculin to her had advised that under no condition should she allow anyone to use the knife on the glands in her neck. Three months later I had

occasion to interview her relative to her financial relations with me and noticed that the eye was free from active inflammatory signs, although in several areas showed the thinned and ectatic sclera. I felt like saying to her, "I told you so," for the glands in her neck had increased almost twofold.

Episcleritis—Sclero-Keratitis.

Case 6. *Mrs. T. L. M.* Age 60 years. Patient had been under the care of a colleague who had diagnosed the condition as "rheumatic" episcleritis.

Past History: Has been exceptionally well all her life, except when nineteen years of age remembers that she had a cough which persisted for a year, during which time she had two hemorrhages. She came to Oregon about that time, regained her health and has been well ever since.

Present History: The right eye began to give the patient trouble about two years ago. Pain, while present at times, was never severe and frequently amounted to nothing more than a sense of irritation and discomfort. There was some lachrymation and photophobia, but the latter symptom was at no time very pronounced. The attacks of inflammation varied in frequency and intensity, and the eye would clear up at intervals and become fairly comfortable. This state of affairs continued for two years, when the patient consulted me. Family physician reported that the patient's physical condition was good, save for an excess of uric acid in the urine.

Examination: Between the insertion of the right internus and the limbus, covering an area approximately 5 mm. in diameter, there was a cluster of four or five small millet-seed-like pearly bodies beneath the conjunctiva. They resembled small phlyctenules but seemed to be of firmer consistence. The conjunctiva over these little bodies was not adherent but many small dilated and tortuous conjunctival vessels could be seen coursing over them. At this time there was a narrow area of infiltration not more than one millimeter in width, extending into the substance of the cornea. Save for a moderately severe supra-orbital neuralgia there were no marked subjective symptoms.

The refraction was carefully estimated with the following result: R. plus 1.50S = plus 0.75C. 180°, L. plus 1.25S. plus 0.25C. 180°. This was prescribed for constant use. The condition of the nose and accessory sinuses was investigated and found to be normal. The teeth were in good condition.

Course and Treatment: Local treatment was prescribed and the patient observed for two weeks. At the end of this time she complained of a fog-like haze over the eye and the vision was diminished from $5/4$ to $5/15$ with correction. The original infiltration in the cornea has extended toward its center and several small discrete areas one millimeter in diameter may be seen scattered throughout this membrane. The Von Pirquet reaction was positive. The temperature was taken four times a day for the next two days and no rise being noted 0.5 mg. O. T. was injected subcutaneously in the left arm. Four hours later patient complained of a chilly sensation coupled with some restlessness and nervousness. Temperature had risen 1° F. above normal. Locally over the seat of the injection there was a distinct area of redness and induration with some tenderness of the axillary glands. There was increased redness of the eye, the haziness of the cornea was more pronounced, and the patient reported that the eye was more painful than it had been for a long time. Three days later she was given an injection of 4 min. Series No. 1 Mulford's B. E., which equals $1/5000$ mg. This dose was increased by 2 min. every other day until she has now reached 14 min. Series No. 2, which equals about $1/140$ mg. The intervals between injections will now be lengthened to one week, but the increment of increase in the dose will remain unchanged unless the patient shows a reaction, and the injections stopped until the reaction subsides. The vision has risen to $5/4$ and the original collection of nodules beneath the conjunctiva has entirely disappeared. The infiltration in the cornea is diminishing gradually but surely.

This patient will be given tuberculin injections until every vestige of the disease has disappeared.

Tuberculous Scleritis, Keratitis and Irido-Cyclitis with Atrophy of Iris and Hyalitis.

Case 7. *Mrs. J. B.* Age 49. Was referred for a very severe chronic inflammation of the right eye from which she has suffered for 27 years.

History: The disease started in the left eye twenty-seven years ago and very soon afterwards the right eye became involved. She has consulted many ophthalmologists during this time without obtaining any relief from symptoms nor were they able to arrest the progress of the disease. The left eye having become sightless and very painful it was removed about a year

ago. The patient says that aside from the ocular disease she always has been in perfect health. The ophthalmologist who referred her to me reported that a Wassermann test was negative. Another under whose care she had been several years ago told me that on the strength of a suspicious history in the husband he had placed her on anti-syphilitic treatment but with no improvement in the condition. No attempt had ever been made so far as I have been able to learn to investigate the possible tuberculous nature of the disease.

Examination: Vision 3/60. The cornea is the seat of discrete, irregular areas of infiltration. Close to the limbus and concentric with it but separated from it by a more or less clear portion of the cornea is an irregular jagged ring of infiltration extending almost around the entire circumference of this membrane. The sclera, for a distance of 8 to 10 mm. back from the limbus and extending around the entire circumference of the anterior ocular segment was very much thinned, showing the dark pigment of the underlying uvea. To the temporal side of the cornea just below the horizontal meridian there was to be seen a distinct nodule deep in the substance of the sclera over which numerous dilated and tortuous vessels coursed. This nodule at the present time no doubt represents the seat of greatest inflammation activity for it is the area about which the patient complains most. The anterior chamber is deeper than normal with a very decided retraction of the base of the iris, which is markedly atrophic and bound down by numerous synechiae to the anterior surface of the lens. These prevent the pupil from dilating beyond an irregular oval 2x3 mm. Tension of the eye with the Gradle tonometer is equivalent to 9 mm. of Hg. The Von Pirquet reaction was positive. With the subcutaneous test not only was there a general reaction but a decided focal one as well, the eye becoming more painful and the ciliary injection increasing markedly. After the subsidence of the reaction a subcutaneous injection of B. E. 1/5000 mg. was given and this dose was increased gradually every other day until the patient was given B. E. 1/500 mg. Several days later the dose was increased to 1/250 mg. and very promptly a marked focal reaction was noted. The reaction having subsided several days later, the same dose was repeated, followed by the same focal reaction. After another interval of a week 1/500 was injected with no focal reaction following.

Inasmuch as the patient lives some distance from Portland and was very anxious to return to her home I consented, but insisted that she place herself under the care of a colleague and have him continue the weekly injections until she could return to me in July.

I have a feeling that I have seen her for the last time. However that may be, I am convinced that in tuberculin injections lies her only hope of arresting the process and preventing the ultimate loss of the eye.

During the twenty-seven years that she has had the disease she has received almost everything in ophthalmic therapeutics except tuberculin. It is to be regretted that this was not given long ago.

Tuberculous Choroiditis and Hyalitis.

Case S. *Mrs. H. F. K.* Age 39. Was seen in consultation with a colleague under whose care she has been for an obscure ocular condition which has reduced the vision in her right eye to hand movements at 33 cm.

Present History. Ten months ago the patient had a reduction in vision in right eye, due no doubt to vitreous opacities which appeared to her as floating spots. This apparently cleared up for she did not complain again for four months, when she had another similar attack which has become progressively worse up to the present time.

Examination: There are no external evidences of disease. The pupil is the same size as its fellow and reacts promptly to light, accommodation and convergence. With the ophthalmoscope it is impossible to obtain a reflex but instead a dense grayish-white exudate can be detected lying deep in the vitreous. With oblique illumination and corneal loupe this exudate could be examined more in detail than with the ophthalmoscope. The exudate apparently fills the entire vitreous chamber extending forward almost to the ora serrata. Upon movement of the eye a certain amount of motion can be detected in those semi-detached lace-like portions of the exudate lying anteriorly. By directing the beam of intense light down behind the lower margin of pupil a yellowish white streak tinged with red can be seen. This streak apparently lies upon the corona radiata. There were no retinal vessels visible. Transillumination failed to cast any shadows and the pupil presented a uniform red glow. I may mention at this point

that one observer made a diagnosis of intraocular neoplasm and advised immediate enucleation. Syphilis was denied.

Von Pirquet was faintly positive. The patient's temperature was taken every 4 hours for two days and recorded. This at no time exceeded $98 \frac{2}{5}$ F. A subcutaneous injection of 0.5 mg. O. T. was given. During the subsequent 24 hours there developed a large red indurated area around the seat of the injection with tenderness of axillary glands but no general reaction. Two days later another subcutaneous injection of 10 mg. O. T. was given. At the end of 24 hours the patient complained of feverishness and lassitude with a temperature of 99.4. There was also a distinct feeling of heat in and around the eye. At the seat of the injection at the end of 24 hours there was the same condition present as in the other arm and in a like degree, but much to my discomfort at the end of another 24 hours the arm was very much swollen, axillary glands tender and painful, and a vesicle 3 cm. in diameter surrounded the point of puncture. This vesicle was punctured and a sterile dressing applied. One week later all evidence of general and local reaction had subsided. The patient was then given $1/10000$ mg. B. E. (Mulford's) subcutaneously and also a subconjunctival injection of normal salt solution. By weekly injections the dose was increased to $1/5000$ mg., $1/2500$ mg. and $1/2000$ mg. After the last one the patient's temperature rose to 100° F. and there was a marked area of redness and induration over the site of the injection, which, however, subsided in 48 hours. After an interval of two weeks the dose was reduced to $1/2500$ mg.

This last injection was given two days before leaving for this meeting and the patient reported a mild local reaction.

Tuberculous Epi-Scleritis and Sclero-Keratitis.

Case 9. *Mrs. W. E. C.* Age 29. Consulted me for a small circumscribed area of inflammation on her left eye.

History: She enjoyed good health up to a week ago, when her left eye began to bother her. Family history negative. Has had no children and no miscarriages.

Examination: There was small circumscribed bluish-red elevation between the insertion of the left external rectus and the limbus, painful and tender to the touch. Pain was neuralgic in character, worse at night and accentuated by nasal rotation. Diagnosis: The condition was thought to be an episcleritis, most probably rheumatic. I prescribed aspirin in-

ternally and dionin and heat locally with laxatives. I saw her several times within the next week during which time the pain still remained very severe and the condition showed no improvement.

I did not see her again for four months when she returned with the eye very much worse. The disease now has extended over to the cornea and into the substance of this membrane in a triangular shaped area of gray infiltration. The pain was most distressing and hard to control. Her nose and accessory sinuses were investigated and gave no evidence of disease. She had some bridge work that looked suspicious but her dentist reported that so far as he was able to determine there seemed no justification for interfering with it unless there was more definite indication for doing so. Her gastro-intestinal canal was thoroughly examined by a competent internist, who reported that aside from some slight tendency to constipation he could find nothing abnormal. Her menstrual function was normal. A Wassermann test was not made. Her husband, however, acknowledged gonorrhea, but said he was positive he had never had syphilis.

Finally, and I say it with a certain amount of chagrin, I thought of tuberculosis as a possible cause; why I did not think of it at first or at least immediately after rheumatism and the teeth I cannot say. Had I thought of it as a cause of her disease sooner I am convinced that in the light of subsequent events I could have saved her at least a month's suffering.

A Von Pirquet was positive and a subcutaneous injection caused a general and focal reaction. She was immediately placed on injections of tuberculin T. R. at weekly intervals and in three months every vestige of the disease had disappeared.

There can be no question as to the value of tuberculin as a diagnostic aid in ocular tuberculosis; with this statement I believe most men are in accord. It is quite another matter to establish the specificity of the ocular reaction, for as Wilder has well said in the report of the committee for the study of the Relation of Tuberculosis to Disease of the Eye, "it is one thing to show that an individual is tuberculous and quite another to prove that the lesion of the eye that he has is tuberculous; and yet, while there may be lacking the positive proof, the presumptive evidence may be strong."

It is obviously impossible in the vast majority of cases either to demonstrate the actual presence of the tubercle bacilli or to secure tissue for making sections and inoculations; nevertheless, as I have said before, in the absence of demonstrable signs of tuberculosis in organs other than the eye in an individual reacting positively to subcutaneous injections of old tuberculin even though there be no focal reaction I would not hesitate to give tuberculin injections. Nor would I feel that in failing to make a positive diagnosis I was subjecting my patient to an unnecessary course of treatment by giving injections of tuberculin; for even though the ocular lesion be other than tuberculous, the increased production of antibodies in the blood of a tuberculous individual could not but have a beneficial effect upon an inflamed eye, whatever its etiology.

Some of the cases that I have reported were "getting no better, fast" under the best of hygienic surroundings, nevertheless they began to improve immediately under tuberculin injections.

To secure the best results it is most important to remember that you are treating the patient as well as the disease and if you would save yourself much anxiety and chagrin it would be well to explain just what you are trying to accomplish and how.

The patient should be told that the disease is essentially chronic and that the treatment is slow, tedious and must cover a period of months; and that there will be exacerbations in the symptoms from time to time. Even with this warning if you do not maintain at all times a distinctly optimistic attitude as to the outcome of the disease the patient will most surely become dissatisfied and discouraged and consult some one else.

Were it not for the satisfaction of having made a diagnosis and started a course of treatment that cannot but have a beneficial effect upon the course of the disease I could almost wish to be the one consulted *after* a two or three months' treatment with tuberculin than before.

DISCUSSION OF THE PAPERS OF DRs. JACKSON AND McCool.

DR. WALTER R. PARKER, Detroit: The subject has been so thoroughly treated that there is little to add except in the way of personal experience. I think there can be no question that ocular tuberculosis has been well proven to be

a distinct clinical entity. It usually occurs in patients not otherwise affected with tuberculosis.

While the diagnosis is often difficult, the points of attack by the tubercle bacilli circulating in the blood are very suggestive. In the iris, for instance, the nodules usually occur either in the pupillary border, or at the base of the iris, near the site of the greater or lesser circle; in the ciliary processes the nodules appear under the epithelium where the plexuses are finest and in and about the disc where there is anastomosis of the blood vessels. The keratitis is secondary to the scleritis which is now generally believed to be an extension from the primary lesion in the supra-choroidal lymph space. One of the most obscure manifestations of tubercular infections occurs in the exudate in the vitreous chamber. The patient complains only of loss of vision. Examination reveals that the vitreous chamber is filled with exudate, and the vision entirely gone.

There are suggestive symptoms which will often aid in the diagnosis. In the first place, the amount of pain is much less than is ordinarily met in so serious an inflammatory process. In the second place, the case does not yield to any other form of treatment. The injection test is the most reliable, and should be made in every case. The question of treatment is one that has varied greatly in the records of the published cases, especially in regard to the dosage. These vary from one-tenthousandth to one or two milligrams of O. T., the injections being given in some cases as frequently as once in three or four days. I agree with Dr. Jackson that we are apt to give too large, rather than too small doses. In my more recent cases, I have started the dosage at one ten-thousandth, and increased it to one four-hundredth of a milligram, repeating the dose not oftener than once a week.

DR. E. W. ALEXANDER, San Francisco: Tuberculosis affects the eye in two ways. First the primary or direct affection with implantation of a bacillus and its aggregation of lymphoid and giant cells, etc. Second the secondary or indirect affection by the action of the circulating toxins from an adjacent or more or less remote tubercular focus. The former is the one usually alluded to, but the latter is more frequent and as Dr. Jackson has mentioned is unaccountably rarely found in cases of pulmonary tuberculosis, in fact most of these cases are found in otherwise perfectly normal individuals. We can sometimes

spot a case as tubercular by taking a two hourly temperature chart with tuberculin injections but more often we have to make the diagnosis by elimination. Tuberculosis of the lymphatics of the mesentery and of the cervical glands are frequently the cause, and my experience has led me to suspect the lymphatics of the throat with particular reference to the tonsils. These can be removed with a great deal of benefit and the obliteration of the real primary cause in large numbers of cases. Again we should not neglect the question of feeding and the possibility of tubercular sources of milk supply.

DR. A. BARKAN, San Francisco: May I add a few words to the very valuable statements made in both papers in regard to a disease which, whilst certainly having been in existence forever, has only been studied carefully of late years. I am quite sure that we older men have overlooked many cases of tuberculosis in the beginning of our practice.

I have made repeated visits of late years to the mountain districts of Switzerland, where consumptives are retiring from all parts of the world for cure (and where many of them *are* cured), and where they keep up their visits for years and years.

I inquired of Professor Turban of Davos whether there are many cases of tuberculosis of the eye, and I was surprised to hear that they were of very rare occurrence. There are about six thousand cases there every winter but very few can be diagnosed as tuberculosis of the eye. That is one point I want to mention which is not uninteresting.

I remember that Professor Leber has mentioned a form of tuberculoosis of the eye ball—if I remember rightly he called it attenuated tuberculosis—which naturally takes a very favorable course, and the eyes recover with no active treatment except a sojourn at the seashore or in the mountains.

I remember a case which developed tuberculous granuloma of the ciliary bodies and iris, in which I recommended enucleation of the eyeball. The mother refused the enucleation, and to my surprise (and I may honestly add to my great delight) I saw that little girl again two years later and the granuloma was gone. I do not remember the details any more, but I know there could have been no mistake about the infection resting on a tuberculous basis.

One thought which came to me during the discussion was how favorable the eye seems to be for the absorption of patho-

logical products, especially of syphilitic or tuberculous origin. Whether it be due to the abundant supply of the eye ball with blood vessels, its lymph channels, or its great rapidity of circulation, there is no question that the eye furnishes a grateful soil for spontaneous absorption of the pathological seeds of syphilis and tuberculosis without very energetic treatment.

In regard to tuberculin, von Müller and Hesse refused to use tuberculin in a case of uveitis where the disease was unquestionably on a tubercular basis. They were afraid to revive the tuberculous foci which existed in those eyes. I think voices are still divided on that topic.

DR. EDWARD JACKSON: With reference to the retinal lesions, I soon found that to go into details regarding them would extend the paper too much; and I wanted especially to bring forward and emphasize the facts that I have put into it. The retinal lesions are mainly vascular, and are often not seen on account of the haziness produced or the actual hemorrhage into the vitreous. But I have followed a few cases in which there was particularly noticeable the swelling and haziness of the vessel sheaths, so that the vessel was entirely hidden, with great swelling about the optic disc. On the whole these lesions can be characterized as vascular, almost as purely vascular as the lesions of angiosclerosis.

Intra-ocular tuberculosis is rare, but its effects are such that vision is always impaired. Probably every case is recognized as a case of eye disease; and on the whole such cases assume a good deal of importance from the effect of the disease on vision. The diagnosis I think must in a large number of cases be reached as indicated, by exclusion of syphilis, sinus disease, dental disease, other disease of the vessels and auto-intoxication arising from the gastro-intestinal tract. I think we have been inclined to apply to the diagnosis of tuberculosis of the retina and choroid more rigid tests than we usually apply to ocular diagnosis. If the patient comes with iritis and you find a positive Wassermann, the assumption is that it is syphilitic iritis. But we have been inclined to think that the tuberculin reaction does not prove that the patient has tuberculosis.

We should not lose sight of the fact that under the name tuberculosis we may be including quite a number of different pathological processes. We have the human and bovine strains, and even beside these there may be varieties of disease that

we now class as tuberculosis which may in future be declared as distinct from each other. But I do think that the recognition of tuberculosis is important in ocular disease. In setting aside a general class of cases which are to be considered as tuberculous, we have made a very definite advance in our knowledge of certain intra-ocular conditions that have heretofore been exceedingly obscure.

A CONSIDERATION OF SOME OF THE OCULAR CONDITIONS DEPENDENT UPON TUBERCULOSIS AND SYSTEMIC GONORRHEA.

BY

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Since the publication of Knies's important work on the relationship existing between the eye and diseases of the body elsewhere, we have gone a long way. Not only has our understanding of systemic diseases been advanced by the ever forward trend of medical science, but thanks to the painstaking observations and studies of ophthalmologists, the participation of the ocular structures in these conditions is much better understood and more widely appreciated. A complete catalogue of this advance would necessitate a labor as great as a wholly rewritten edition of Knies would involve (a task, by the way, which it is hoped some able editor may soon assume) and would be quite beyond the scope of this paper. I shall therefore record, as briefly as possible, what appears to me most essential in the treatment of ocular diseases as they are occasioned by tuberculosis and systemic gonorrhea, as I have long been particularly interested in the participation of the eye in these conditions and have already made several communications upon these subjects, from which I have taken the liberty of freely quoting.

1. Tuberculosis.

As many individuals with affected eyes which present locally the clinical picture which we are accustomed to associate with tuberculosis, bear no physical signs of that disease, it is necessary before the diagnosis can be made with certainty that some test of tuberculosis be made, which will give more or less positive evidence of its existence. For this purpose it is desirable to institute a tuberculin test.

This consists in injecting an initial dose of 1 mg. of T. O. into the subscapular tissues. Before making this injection, however, the morning and evening temperature of the patient should be ascertained for several days previously, and if fever be present, the dose should be halved. Following the injection, the patient should be confined to bed and the temperature taken every two hours, to record a rise. Note should always be made of any exacerbation in the inflammatory symptoms in the affected eye or increase in the size of the nodules. Should the first injection fail to produce any general or local reaction, a second of 2 mg. of T. O. should be administered at the end of 48 hours and the reaction searched for, as in the first test. Usually the second injection suffices to unmask the tubercular process, but in the event of negative results, a third injection of 3 mg. should be made at the end of the fourth day, in order to reach a positive conclusion. Should that also be negative, it may usually be assumed that the process is not tubercular, though Trudeau believes that negative results should not, when applied within the moderate doses described, be considered absolutely infallible. It must be remembered however, that a local ocular reaction is essential to establish a diagnosis of ocular tuberculosis, for the general reaction may be occasioned by tubercular foci elsewhere in the body which have escaped detection in the physical examination.

While the test which has just been described is beyond doubt the surest means of diagnosis, it is not always feasible, on account of the difficulty experienced in persuading the patient to remain in the hospital for the time necessary to complete the test, while the general reaction which may follow is often alarming to the patient, and may lead him to abandon the tuberculin treatment which follows. For this reason the cutaneous test, the vaccination of the upper arm with full strength tuberculin, as recommended by von Pirquet, is in general use, and while it is generally recognized that a positive cutaneous test is often misleading, two negative vaccinations must be regarded as practically excluding the presence of a tubercular focus.

Ocular Manifestations.

On account of the scarcity of tubercular conjunctivitis and the necessity for brevity, the consideration of this condition will be omitted and we will at once pass to the more common and consequently more important subject of tuberculosis of the

anterior segment of the eyeball, namely to tubercular keratitis, sclerosing keratitis, iritis and uveitis.

Opinions differ widely concerning the type of corneal inflammation which tuberculosis gives rise to, some maintaining the impossibility of distinguishing tubercular keratitis from the syphilitic variety, while others have ranged the types of inflammation into groups. Bach, for example, has proposed the following clinical classification: The *parenchymatous* type, attributed to the action of tuberculous toxins on the parenchyma; the *sclerosing* type, attributed to tuberculous disease of the pectinate ligament; keratitis of the cornea-scleral margin, unassociated with tuberculous disease of the iris or pectinate ligament, and corneal affections secondary to bacillary tuberculosis of the conjunctiva. *Sclerosing parenchymatous keratitis* is described by him as being probably tuberculous in nature. This form of corneal disease begins with a localized episcleritis, near the limbus, followed by a nodular, parenchymatous eruption a little distance from the seat of the episcleritis. Between it and the margin of the cornea the corneal tissue is healthy, or at most, oedematous.

In my experience, the projection of a tongue-like area of yellowish-white infiltrate from the limbus into the interstitial lamellae of the cornea toward its center and the occurrence of discreet yellowish-white oval areas, which appear caseous and avascular, is very significant of tubercular keratitis, while I have observed the deposition of small rounded areas resembling drops of cold mutton fat upon the posterior surface of the cornea or in the lamellae of the cornea, secondary to tubercle of the iris and of the deeper parts of the eye. According to Michel, the typical picture of tubercular interstitial keratitis is almost always preceded by the formation of tubercular nodules in the pectinate ligament, the corneal involvement appearing secondarily. Bach, however, is of the opinion that tubercular nodules may be found primarily in the periphery of the cornea.

Both von Hippel and Zimmerman hold that tubercular keratitis may exist without any other discoverable signs of tuberculosis in the body whatsoever. Fuchs, Leber and de Wecker, however, dissent from the view that the eye is ever the primary seat of tuberculosis, contending that a primary tuberculosis focus (e. g., caseous bronchial glands) although not demonstrable clinically, must be assumed to exist.

Although the great majority of cases of interstitial keratitis are undoubtedly due to inherited syphilis, no syphilitic history is obtainable in at least thirty per cent of the cases, and in recent years there has been a growing conviction that tuberculosis is responsible for many of these non-syphilitic cases. Hippel, Zimmerman and others have found tubercular nodules with giant cells in the cornea of suspected cases, and tubercle bacilli, though few in number, have been observed in the giant cells.

Bürstenbinder, in his inaugural dissertation on tubercular iritis and keratitis, reported three cases which presented the ordinary picture of interstitial keratitis, which were proved later to be of tubercular origin. Nakagana found bacilli in the deeper layers of the cornea, with invasion through Descemet's membrane and tubercular iritis, and Stock, by injecting living tubercle bacilli into the blood-stream of rabbits, produced a severe iritis and interstitial keratitis without nodular formations and without bacilli, which he attributed to the effect of toxins.

In his valuable and comprehensive monograph upon "Intraocular Tuberculosis" which was read before the Congress at Madrid, Treacher Collins cites a series of interesting examples of how the eye may be infected with tuberculosis, and has discussed the various modes of exogenous and endogenous involvement. Thus, as an example of the former, a case of Greef's is recorded where a tuberculous patient infected his own cornea by a scratch of the finger-nail, a vascular ulcer forming, which showed but little tendency to heal.

When the uveal tract is the seat of tuberculosis, Collins states that the cornea may be invaded by typical tuberculous nodules, or it may be the seat of a diffuse inflammatory infiltration, i. e., interstitial or parenchymatous keratitis.

The first mode of invasion is well illustrated in a case of solitary tubercle of the iris which I presented before the American Ophthalmological Society in 1904, in which Descemet's membrane gave way under pressure from the tubercle, permitting the substantia propria to become invaded by the tubercular tissue.

The second mode of invasion is demonstrated by another case reported at the same meeting, the interstitial haze of the cornea which developed during the growth of a tubercle in the choroid having been originated in all probability by toxins from tuberculous nodules which had formed in the iris.

Of fifty-two so-called phlyctenular keratitis, collected by Derby and Ayer, the cutaneous test for tuberculin was positive in 92.3 per cent; 44 per cent showed positive physical findings of tuberculosis. In a series of forty-three phlyctenular cases published in the year preceding by Derby, 88 per cent reacted to tuberculin. Of one hundred and twenty-three adult patients with phlyctenulae collected from Uhthoff's clinic by Cohen, 63.4 per cent were tuberculous.

In the treatment of ocular tuberculosis, I follow the method of von Hippel, with some modifications, beginning with a dose of 1/500 mg. of T. R. and doubling the dose every 48 hours, until a reaction, general or local, is obtained. After an interval of some days, when the reaction has subsided, the dose weakest to that which produced the reaction is injected twice a week, until the condition improves, when the treatment is applied less frequently. The maximum dose so administered should not exceed 1 mg.

In hospital practice, the formation of a tuberculosis class, as recommended by Derby, is to be commended. At the Mass. Eye and Ear Infirmary such a class consists of an ophthalmologist, an internist, a social worker and a nurse. To abstract a paper by Dr. Derby on the subject, each patient is given a book in which a minute record of his daily life may be recorded. The patients are visited in their homes and are taught cleanliness and personal hygiene. Antituberculous diet and forced feeding is prescribed. When proper treatment cannot be carried out in the homes, the patients are referred to various institutions with facilities for handling tuberculosis. Although as a rule Dr. Derby has found that tuberculous cases did not need tuberculin, they all do better when it is used. He employs a bouillon filtrate from Saranac and begins ordinarily with an initial dose of 0.0001 mg. Small increasing doses are continued at weekly intervals, until a cure is effected. Most of the patients in phlyctenular classes soon recover and remain well if they continue to live in good hygienic surroundings. Deeper processes are much more stubborn and require treatment for many months. Recurrences are not unusual even when the patient's condition becomes robust and the patient should be enjoined to report monthly for oversight and advice.

I am of the opinion that the discovery of tuberculin is one of the greatest achievements of modern medicine, and that by its aid in establishing the diagnosis of tuberculous cases, and

its employment in the treatment of such cases, not only are many eyes saved, but the whole organism protected from invasion by the disease.

2. Systemic Gonorrhea.

Metastatic conjunctivitis has long been a recognized disease of the conjunctiva, but it can scarcely be said to be, even at this time, a generally recognized condition, for ophthalmologists make but little of it, and rarely diagnose it. Iritis and cyclitis secondary to a specific urethritis are well known, and not uncommon ocular conditions, but attention is called but rarely to a conjunctivitis of similar origin. A century ago, before Jaeger, in 1811, accidentally discovered the direct contagiousness of the gonorrheal secretion, practitioners thought all cases of gonorrheal ophthalmia were of metastatic origin. After Jaeger's experience, however, the metastatic theory for the origin of conjunctivitis died out, though it still held for iritis and joint affections, so that in their time Arlt, Mackenzie and von Graefe all denied the possibility of a purulent conjunctivitis arising other than by direct infection. In 1866, Fournier, however, in a lengthy treatise upon blenorrhea, showed conclusively that there were cases of conjunctivitis which occurred in association with a specific discharge from the urethra, which were dependent, not upon direct, but upon metastatic infection. The author stated that he had found this form of conjunctivitis fourteen times more frequent than that caused by direct infection, and these figures were supported by J. William White, writing twenty years later, who stated that he had found only one instance of gonorrheal ophthalmia among seven hundred to eight hundred gonorrheal cases, while he had observed once case with metastatic conjunctivitis among fifty to sixty cases.

The first ophthalmologist to call attention to the existence of a conjunctivitis which was not occasioned by direct infection with gonococci was Haab, who reported a case of conjunctivitis in both eyes in a gonorrheal subject, which was cured in six days. There were no gonococci in the secretion. Haltenhoff described five similar cases and gave the literature, and other instances have been recorded by Parinaud, Vanderstraeten, Gielen, Lichtenstein, Van Moll, Morax and Elmassian, and Fage, so that there can now be no question but that conjunctivitis may arise in gonorrheal cases from metastasis, quite similarly to iritis, scleritis and optic neuritis, and the ex-

planation of this is not difficult when one reflects how often the ocular mucous membrane in common with other mucous membranes constitutes an avenue of escape for abnormal and toxic fluids. How often do we not find that rheumatism and gouty inflammations of the conjunctiva and episcleral tissues, and the eczematous eruptions which occur there, are attributable to an auto-intoxication of gastro-intestinal origin? The extensive lymphatic system in this region, and the circulation of fluids through it, doubtless frequently occasions the deposit of organisms there which are more or less laden with toxins, and even with microbes themselves.

Although the reports of cases of metastatic conjunctivitis where bacteriological examinations have been made are few, it would appear that although the gonococci are found in the conjunctival secretion in some cases, they are absent in most. At times other micrococci have been found, but with the exception of staphylococci, which were discovered in the secretion by Van Moll, and thought by him to indicate a general toxemia by that organism as a product of urethritis, they may all be regarded as accidental findings.

This absence of the gonococci in the conjunctival secretion has been accounted for either by the fact that the conjunctivitis is excited by bacteria other than gonococci which originate in the urethra and invade the eye by way of the blood channels, or by the view that the inflammation is not the result of infection with micro-organisms at all, but is excited by the action of toxins generated by the gonococci. Axenfeld, in the discussion of Van Moll's paper upon the subject before the Ninth International Ophthalmic Congress in Utrecht, suggests, however, that even though the gonococci are not found in the conjunctival secretion, they are not far off, but lie imbedded in the conjunctival tissue, and excite the inflammation from that point. According to him, the variable bacteriological findings which are observed in these cases may be explained in this way, and Morax, who has examined quite a large number of cases bacteriologically, has adopted the same view. Both agree that where gonococci are found in the conjunctival secretion, that an exceptional intensity of the inflammation is indicated. They suggest that the classification of all cases of metastatic conjunctivitis should be divided into two forms, severe and mild, according as gonococci are present or absent.

Just as in metastatic iritis, this form of conjunctivitis may

occur in combination with an attack of gonorrheal rheumatism, or independently of it; in most cases, however, joint involvement is present. According to Haltenhoff, the conjunctival affection may manifest itself either at the time of disappearance of the local urethritis, or two weeks later, or in other cases, at the lapse of several months.

The inflammation of the conjunctiva has been observed in conjunction with iritis by Rückert, and with optic neuritis by Panas, and Cottman and Haltenhoff have reported corneal complications. It has a strong disposition to recur, and this is particularly apt to happen with an exacerbation of an old attack, or with a fresh outbreak of urethritis.

White has given an excellent description of the chief clinical features of the disease, in a comparative table which he prepared, to show the distinction between this form of conjunctivitis, or *gonorrheal ophthalmia*, as it was formerly designated, and true *gonorrheal conjunctivitis*, or conjunctivitis from direct infection.

Gonorrheal Conjunctivitis.

Produced by contagion only.

Occurs once in seven hundred or eight hundred cases of gonorrhea.

May be derived from a second person by pus inoculation.

Involves one eye primarily.

Remains limited to eye originally affected, unless the other eye is accidentally inoculated.

Symptoms affect the conjunctiva from the start.

Symptoms of greatest gravity and urgency.

No association with subsequent gonorrhea.

No relation to joint troubles or other rheumatic manifestations.

Tendency to rapid destruction of tissues involved.

Treatment very useful; should be prompt and energetic.

Gonorrheal Ophthalmia.

Produced probably by septicemic infection. Has no relation to direct contagion.

Occurs once in fifty or sixty cases.

Can occur only in a person having urethritis.

Involves both eyes usually.

Frequently passes from one eye to the other.

Symptoms affect the fibrous tissues, the sclerotic coat and iris.

Symptoms mild. subacute.

Frequently returns with each later attack of gonorrhea.

Most commonly found to coexist with some other form of gonorrheal rheumatism.

Tendency to final but slow cure.

Treatment not very effective; should be mild and expectant.

In addition to this description, it may be remarked that the inflammation frequently begins at the external canthi as a serous edema associated with copious muco-purulent secretion, and then becomes localized for the most part in the retrotarsal folds, and that in acute cases the bulbar conjunctiva becomes quite chemotic, and the lids edematous and swollen.

The therapeusis of metastatic conjunctivitis consists in the application of local remedies to the conjunctiva, in the treatment of the urethral condition, and in the administration of drugs to control the toxemia.

Cleanliness with astringents which should be varied in character and strength to meet the varied degrees of inflammation should be included under the local treatment, and the salicylates will be found of great service in meeting the latter indication.

Byers, in his classic monograph upon the ocular manifestations of systemic gonorrhea, has recorded forty cases of affections of the cornea, of which nine were probably metastatic in origin, eight doubtful in regard to origin, being either primarily metastatic or else secondary to some preceding metastatic conjunctivitis, while one was due to secondary contamination from the conjunctival sac.

Of the nine cases which were probably metastatic in nature, Byers summarized that there were two in which the substantia propria of the cornea was clearly affected, five in which the inflammation was superficial in character, and in four instances confined to the epithelial structures. In all seven instances the ulceration seemed to have affected the central rather than the peripheral portions of the cornea. In a series of six of his cases in which the fact was noted, two were double-sided and four unilateral; and in a further series of six cases, the corneal deposits multiple in five instances and single in one. From these figures Byers asserts that "one is justified in inferring that the keratitis associated directly or indirectly with systemic gonorrhea is typically of a multiple and superficial nature, commonly symmetrical in character and central in situation."

In 1906 I reported a case before the Section of Ophthalmology of the College of Physicians of Philadelphia, of superficial punctate keratitis, in association with an attack of conjunctivitis and iritis of metastatic gonorrheal origin in a young man the subject of multiple arthritis, and I have since noted small round saturated ulcers near the limbus in several other cases of irido-cyclitis due to metastatic gonorrhea.

Gonorrheal iritis has long been recognized as a definite form of ocular disease; indeed Brodie described this variety of iritis as early as 1834, and Mackenzie and other British ophthalmologists were well acquainted with it. In the majority of cases, perhaps, the last attack of gonorrhea occurs some years

previous to the iritis, and in most instances there is no attending arthritis. As Higgins has well said, "the probability is that in many men who have had gonorrhea frequently there is left for any number of years in some part of the urinogenital apparatus a very much attenuated virus, which gives no trouble locally, but from time to time becomes more active, and though still setting up no local irritation, is capable after absorption of causing inflammation in synovial membranes or in the iris; in fact it looks almost as if the iris becomes on occasion an excretory organ and tries to eliminate the poison, receiving considerable damage to itself in the attempt."

Iritis, arthritis, and endocarditis may occur independently or simultaneously, the association being accidental and not necessary, the gonorrheal poison, as Lawford has stated, having like that of most infectious diseases, certain seats of election in the tissues, and it is in no way surprising that evidences of the existence and activity of the poison should appear in several such tissues at or about the same time. As the same author has also pointed out, both gonorrheal arthritis and gonorrheal iritis have certain points in common. They are both prone to relapse and leave behind them an apparent vulnerability of tissues which may and often does persist for a very long period. An eye which has been attacked by gonorrheal iritis and a knee-joint which has been the seat of gonorrheal arthritis, are liable to recurrences of inflammation without any fresh gonorrheal infection. This liability may last for years. There must, however, be a personal element or an idiosyncrasy in those who suffer, because the proportion of persons who have arthritis and iritis to those who have had gonorrhea is very small.

The late John Griffith attached great importance to gonorrhea as a causative factor in iritis, and thought that the ocular inflammation was not only liable to occur as a complication, but also as a sequel of gonorrhea, the ocular manifestation of constitutional gonorrhea appearing, in his experience, many years after the complete disappearance of the initial local inflammation. Though in some of his cases it was impossible to exclude a very protracted gleet, in the greater number there was every reason to believe that the urethritis was a thing of the past, and that a considerable period had elapsed since the final disappearance of the gonorrhea. He did not imply that the poison of gonorrhea in the system is the precipitating cause of

the iritis, for many agents such as exposure may determine the attack, owing to the reduced tissue resistance of the body wrought by the gonorrheal poison, a feature parallel to that of a gumma in syphilis.

To prove the existence of gonorrheal iritis, Griffith thought the following conditions must be present: 1. An attack of iritis, prone to recur. 2. Gonorrhea at some antecedent date. 3. Rheumatic pains, either arthritic, muscular, or facial, developing subsequent to the urethritis. 4. Exclusion of other causes of spontaneous iritis.

Gout and chronic rheumatism, as well as gonorrhea, have long been recognized as capable of giving rise to iritis, indeed no less an authority than the late Dr. Wm. F. Norris, averred that the majority of cases of iritis which he had been called upon to treat were due to that cause. A number of observers, however, are very skeptical of rheumatism per se evoking iritis, and believe that a great number of the so-called cases of rheumatic iritis are really gonorrheal in origin. My own experience teaches that iritis dependent upon rheumatism does frequently occur, but I am also convinced that a gonorrheal element is often present in a large number of rheumatic cases, and that where this is the case the disease assumes a very virulent type. It should be remembered, however, as pointed out by Berkely Hall and Jonathan Hutchinson some years ago, that those with a gouty constitution are more apt than others, other things being equal, to suffer from gonorrheal iritis, as they observed that people who had gonorrheal arthritis were frequently the descendants of those who had suffered from undoubted attacks of gout. The proof of this observation has recently been demonstrated by Treacher Collins, for of one hundred cases in which he and Silcock inquired into the constitutional history of primary iritis, fourteen occurred in connection with gonorrheal arthritis, and of fifteen cases of gonorrheal arthritis who had iritis Collins found an undoubted family history of gout in five of them! In such cases he thought it likely that the iritis might be attributable to inherited gout, rather than to the gonorrheal attack.

Of one hundred and fifty-nine cases of iritis at St. Bartholomew's Hospital, fifty-six adult males gave no evidence of syphilis. Of these twenty-eight, or 50 per cent, had suffered from gonorrhea. Of the twenty-eight, twenty-six had a history of arthritis, past or present. Finally, in thirteen of these

twenty-six, the association of gonorrheal arthritis and iritis was so close as to justify the term "gonorrheal iritis." This was equal to eight per cent of gonorrheal cases out of one hundred and fifty-nine cases of primary iritis. In another series of forty severe cases of gonorrheal arthritis, eight were women without iritis, and thirty-two men, of whom five (15.6 per cent) had iritis as a complication.

Beaumont, living in Bath, England, sees a large number of men of good health with iritis accompanied or preceded by rheumatism in the joints or lower limbs. They confess to a gonorrhea, many months or years before the rheumatism, but are sure there is no relationship of a parental nature between the gonorrhea and the iritis. Iritis occurs but seldom in the rheumatoid cases which come to Bath, and Beaumont explains this by the suggestion that iritis is a symptom of the earlier stages of the disease, whereas the patients who seek relief in Bath are in the later stages. My own experience is not in accord with this, as I have treated a number of most intractable cases of iritis in advanced cases of rheumatoid arthritis.

Beaumont observed several cases in quite aged women, the inmates of homes, in whom any complicating gonorrheal agency, if present, must have been extremely remote.

Despite the claims of a number of observers, the employment of gonococcic vaccines in the treatment of ocular affections due to metastatic gonorrhea has not been attended with flattering success. In his paper upon Vaccine and Serum Therapy in Ophthalmology (1910), Weeks quoted the experience of several writers, my own among them, in which the vaccines seemed to have been of some service in lessening the severity and shortening the course of the ocular disease. He also cited two cases of his own, in which injections of from five to ten millions of the dead gonococci exercised a favorable influence upon the course of the disease. Since this publication, I have employed the serum in a dozen cases or more and have arrived at the conclusion that in most cases it is without benefit and in some others productive of harm, as in several instances. lymph extravasations into the anterior chamber followed some hours after the serum was employed. It is true these extravasations cleared away in about a week's time without leaving bad results, though the course of the disease appeared to have been unusually prolonged in consequence of them.

REPORTS OF SOCIETIES

COLORADO OPHTHALMOLOGICAL SOCIETY.

C. A. RINGLE, M. D., GREELEY, PRESIDING.

OCTOBER 16TH, DENVER.

Dr. Edward Jackson presented the Society with a copy of Dr. Julius Hirschberg's *American Ophthalmologists*, with the author's compliments.

The Society decided to hold another Ophthalmological Congress in Denver in 1916.

Secondary Glaucoma.

Dr. G. F. Libby exhibited a man, aged 37, who 16 years ago had a piece of steel in the left eye, which at the request of another doctor, Dr. C. E. Walker had extracted by means of the magnet. Prompt healing with no inflammatory reaction followed. Vision of the eye has gradually failed since accident. Two months ago glaucoma developed suddenly and there is at present naught but light perception. There is opaque lens matter, exudate in pupillary area and extensive posterior synechiæ. X-ray negative. Question—what is best to be done?

DISCUSSION.

Dr. C. E. Walker stated that he had no recollection of the case, but that with regard to the present condition, thought that it might be well to remove the lens.

Dr. Melville Black thought the suggestion to remove the lens a good one, and advised such course.

Dr. E. T. Boyd said that if there were any operations the result of which the doctor would like to examine microscopically, it would be well to perform them upon this eye as in his opinion it would be but a short time until opportunity for such examination would be presented.

Dr. Edward Jackson observed that such cases do occur in which the eye quiets down and suggested the use of eserine. Dr. Libby replied that myoties had been and were being used.

Two Cases of Partial Albinism with Congenital Nystagmus.

Dr. W. F. Matson presented Nettie V., age, 18, with lateral and rotary nystagmus; irides gray. O. D. V. 20/45 W. plus 1.00 = —4.00 ax. 5 : O. S. V. 20/40 W. plus 2.50 = —2.50 ax. 175.

Homer V., age, 12, congenital, horizontal nystagmus. O. D. V. 20/45 W. plus 3.00 = —3.25 ax. 180: O. S. V. 20/35 W. plus 0.75 = —4.50 ax. 180.

The two are brother and sister, of a family of eight children, the rest of whom are normal. Family history negative. These children are well advanced in school for their ages.

DISCUSSION.

Dr. Black said that he had found that some form of colored lenses gave better results than clear ones in these albinotic cases.

Dr. Libby remarked that the advancement of these children in their school work proved the incorrectness of the supposition that those so afflicted were dull. In these cases of partial albinism, as years go by, more or less pigment deposit takes place with consequent improvement.

Dr. Jackson said that he had had a case of a partial albinotic child in which the father, in early childhood, had been the same but at the age of 35 would not be so classed—much pigment had been deposited, the hair at this time being brown.

Dr. A. C. Magruder stated that four days ago he saw a case in a boy of seven, about like those shown by Dr. Matson; this boy had been wearing correction of $+ 2.00$ but under atropine accepted $+ 2.00 = + 1.50$ ax. 180 with great improvement.

Dr. W. L. Hess saw the girl shown by Dr. Matson, seven years ago, and now notes marked improvement in the appearance of the eyes, vision and nystagmus.

It was brought out in the discussion that notwithstanding the absence of pigment, greatly impaired vision and violence of nystagmus, these cases sometimes make wonderful improvement, hence a guarded prognosis had best be given.

Removal of Tarsal Cartilage with Overlying Conjunctiva for Trachoma.

Dr. D. Strickler had a young man present who had had trachoma five years and came to him with perforating ulcer of the cornea. Dr. D. H. Coover had seen the case with him, had suggested and removed the tarsal cartilage with overlying conjunctiva, to the great relief of the patient and improvement of the corneal ulcer. There were some granulations at the site of the operation, and Dr. Strickler wished to know what if anything should be done with them?

DISCUSSION.

Dr. Black said that he had seen Dr. Fox of Philadelphia remove the tarsus with conjunctiva: it is a much simpler operation and followed by more rapid recovery than the older

one of ordinary excision with preservation and suture of the conjunctiva, which causes great reaction and slow recovery.

Dr. E. R. Neepser had had no experience with this particular operation and spoke of Dr. Weeks of New York and Dr. Beard of Chicago being opposed to excision of the tarsus.

Dr. W. H. Crisp referred to a patient in whose case excision of the tarsus was performed by Dr. Wood of Chicago, at the County hospital a year or so ago, and said that no benefit resulted, nor was there improvement until Dr. Bane operated upon the nose.

Dr. Walker suggested that the tarsus be removed from the cutaneous side and leave the conjunctiva intact.

Dr. Boyd raised the point that if it could be done as well or better from the under surface, was it not advisable to avoid skin incision because of the tendency to keloid formation about the eyes? Dr. Walker did not believe that keloid was more prone to appear here than elsewhere.

Choroiditis.

Dr. E. F. Conant presented this case in the person of Mrs. M., age 22, who says that she first noticed failing vision of the right eye $2\frac{1}{2}$ years ago. No disease of the left eye, which under homatropine correction reads 18/13 W. $+ 0.75 = + 0.25$ ax. 90.

Patient denies syphilis. In July last she had a miscarriage at 3 months, which she says was due to and immediately followed a fall sustained by her at that time. Urinalysis, negative. Vision of right eye at first examination 18/24 and four days later 18/20. Ophthalmoscope reveals hazy vitreous with floating opacities and very obscure disc. Small atrophic patch and small area of pigmentation near macula.

DISCUSSION.

Dr. F. R. Spencer asked as to the examination of the nose and Wassermann. Thought the condition undoubtedly specific.

Dr. Black thought it remarkable that the woman could see so much when so little could be seen with the ophthalmoscope. Suggested that the sinuses be examined and Wassermann made, but believed it to be specific.

Dr. W. C. Bane said that it was a nice case to demonstrate the value of the indirect method by which the fundus was clearly seen.

Partial Circumcorneal Congestion.

Dr. W. H. Crisp presented Mrs. A., age 39, who gave a history of repeated attacks of redness of the right eye, fugitive in character, until the last two or three months it has been constant. No special pain. Near the nasal limbus there is a whitish mass about 3x2 mm. There is decided congestion around the cornea except above—this is red rather than purple. Slight thickening of the conjunctiva at lower temporal margin. Pupils and irides normal. Where she has been living it is sunny, windy and dusty; auto driving aggravates her condition. Had tubal abscess in January, 1914, and rheumatism for a year following. At this time or during the summer of 1914 had been given antigonococcic serum.

The case had been under Dr. Crisp's care for a month, during which time he had occasionally applied tannin and administered aspirin, but for the past several days had been using atropine.

DISCUSSION.

Dr. Black believed the cornea to be somewhat anaesthetic. Did not appear to be vernal conjunctivitis. Thought the condition due to some general infection, probably gonorrhoeic.

Dr. Boyd said that the condition was what he regarded as a localized cyclitis, and like most such cases, due to systemic infection. Believed the congestion would rapidly subside under atropine.

Dr. Jackson did not think there was evidence of the ciliary being involved, though possibly due to general infection.

Dr. Libby had had similar case that cleared up.

Dr. Walker looked upon such cases as episcleritis and treated them with an ointment of ammoniated mercury, grs. v to 5ii.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

MR. PRIESTLEY SMITH, PRESIDENT.

NOVEMBER 3RD, 1915.

The president made sympathetic reference to the recent death, after an operation, of Mr. George Coats, of whose scientific contributions he spoke very highly. Mr. Coats officiated as Honorary Secretary to the last Congress of the Ophthalmological Society, and carried out those duties with great thoroughness and courtesy; he was also at one time Honorary Secretary of this Section.

Captain Ormond showed a case which exhibited associated

movements of jaw and eyelid, and discussed the probable ætiology, based on Mr. Bishop Harman's work.

Dr. C. W. Daniels contributed a paper entitled "Eye Lesions as a point of importance in directing suspicion to possible Trypanosome Infection." He pointed out the practical importance to be attached to the eye lesions as a diagnostic sign of infection with trypanosomes, inasmuch as in some cases they first determined the patient seeking medical advice. The common manifestation was an iridocyclitis, while a pronounced œdema of the lower lids was not rare. Choroiditis was less frequent. The incidence of the eye lesions stood in direct relationship with the severity of the infection. Thus, in Rhodesian trypanosomiasis the eyes were affected in 83.3%, in Nigeria cases in 40%, and in cases from Uganda and other parts of tropical Africa in 18.7%. The mortality from the disease in those three regions was, respectively, 100%, 30%, and 18%.

Mr. Leslie Paton, who read the paper in the author's absence, discussed the subject, and spoke of Mr. Browning's work in regard to the blood changes found in sympathetic ophthalmia.

Mr. Sydney Stephenson read a communication entitled "A Fallacy in the Diagnosis of Glioma Retinæ," describing the clinical and pathological details of two cases, both in young children, whose blind eye was excised under the impression that it contained glioma. It was found, however, that it was affected with the rare disease retinitis exudativa (retinitis hæmorrhagica externa). The author laid stress on this possible source of confusion.

The paper was discussed by the president, Mr. Treacher Collins (who suggested useful differential signs), Mr. Stephen Mayou, Mr. J. B. Lawford, Mr. Jessop, Mr. Zorab, and Captain Ormond.

Mr. A. Hugh Thompson read a paper on "Late Results of the Operative Treatment of High Myopia." He said that five years ago he published some notes based on his experience of twenty myopic eyes, the clear lenses of which he had needled, with the object of making the refraction approximately emmetropic. His purpose now was to relate his further experience of such of those cases as he had been able to keep in touch with. During the last five years, in common with many others, he had been chary about recommending this operation, though

he still maintained that in carefully selected cases the treatment was a good one. As one could not be certain about the future of these eyes, the procedure should not be pressed upon any patient, for one could not promise cure, and the eye was left just as liable as ever to those destructive processes which attacked highly myopic eyes. The degree most suitable for operation was 16 to 22 diopters. In young children, whose myopia was certainly progressive, a limit of 14 D. might well be assigned. With a myopia of more than 22 D., the chance of the eye remaining free from destructive processes was small. His method had been a free needling of the lens capsule, after which it was necessary to watch the patient carefully day by day, and in the event of a rise of tension, let out the lens matter by means of a keratome incision through the cornea. Should a secondary membrane form some years after, this must be needled. He had been able to follow up 14 cases, during periods of five to fifteen years. Only one patient was operated upon in both eyes, and he did not think the advantage justified the double operation. In all the 15 eyes, the result of the operation was good, and the subsequent results he tabulated in detail. Two-thirds of the cases, after an average period of eight years, had materially better vision than before the operation. In not one of them had he to deal with a detachment of the retina as a sequela of the operation, though it was well known to occur occasionally. He did not think the operative treatment of high myopia tended to counteract the increase in the long axis of the eyeball, though obviously the removal of the lens had the effect of diminishing the result of the lengthening of the axis of the eyeball on the refraction by about one-half.

An interesting discussion ensued, which was taken part in by Mr. Harrison Butler, Mr. R. Coulter, Mr. Arnold Lawson, Mr. W. H. Jessop, Mr. Holmes Spicer, Mr. Zorab, and the president.

PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

E. B. HECKEL, M. D., *Chairman.*

OCTOBER 11TH, 1915.

(Concluded.)

Case 2. Male, age 76, retired physician. The left eye had been practically blind from a large central retinal exudate for six months. About two months ago simple glaucoma developed

in this eye, the tension reaching 70 mm., with considerable frontal and temporal pain but no acute inflammatory phenomena. Eserin failed to give relief in two weeks and iridotaxis was performed late in July; the result was complete relief from pain and normal tension.

Peculiar Ocular Injury.

Dr. Edward Stieren reported a case of a two-year-old girl whose brother had found a dynamite cap and which exploded in his hand injuring her right eye. When seen about two hours after the accident, the lids were puffed and tense; on separating them a piece of tissue filling the entire aperture of the lids presented. When removed, this proved to be a distal phalanx of one of her brother's fingers and contained shattered bone, finger nail, muscle and integument. The cornea was only scratched and the eye made a perfect recovery.

Tubercular Cyclitis.

Dr. E. A. Weisser presented a case of tubercular cyclitis in a girl of 14. The eye had been inflamed three months when she was first seen and vision was 6/9 in the affected (right) eye. The iris has been normal; fundus negative; tension —2; gray deposits are seen on the posterior surface and in the cornea. A Wassermann test was negative, but a von Pirquet was positive. Tonic antitubercular treatment has been employed with good results.

DISCUSSION. Dr. Stieren was of the opinion that a negative von Pirquet was not of much diagnostic value; he prefers the tuberculin test and looks for reaction in the affected eye as well as a general reaction. He favors the tuberculin treatment in these cases and has seen nodules disappear in tuberculosis of the choroid, a scar remaining. He would not hesitate to use tuberculin in this case.

Dr. Curry stated that he had a case in a man of 28, that had a similar condition but in a less marked degree. He treated him for cyclitis, then later for phlyctenular conjunctivitis and still later the patient was treated for intestinal tuberculosis. He became much better for a time, then again had intestinal trouble; he then was given tuberculin treatment with good results in both the ocular and intestinal conditions.

Dr. Weisser stated that in the case under discussion, there were no chest lesions; the mother had died of tuberculosis.

Failure of Accommodation in Diabetes.

Dr. S. A. Sturm presented the following case: Miss E. H.,

age 26; stenographer. Family history negative. No illness until the present trouble began two years ago. At this time she weighed 167 pounds, but gradually lost flesh so that her present weight was 120. One month ago her vision became blurred and she could not read; this passed off in a day or two and her vision became normal again. Ten days ago, after the usual day's work at the office she attended the theater and while watching the performers, her vision became so blurred that she could not see the performers distinctly. The next day she was unable to work because of failure of accommodation. She consulted Dr. Sturm the next day and he found the eyes as follows:

O. D. v. 20/50 and Jaeger No. 10.

O. S. v. 20/50 and Jaeger No. 10.

Media clear and fundi negative except for slight blurring of the edges of both discs. The refraction under atropin was:

O. D. $+2.50 + .50$ axis 90—20/20.

O. S. $+2.50 + .50$ axis 90—20/20.

For the past two years the urine has contained large amounts of sugar and other symptoms of diabetes were present. Under restricted diet the sugar has gradually diminished in quantity and the accommodation has returned to normal.

DISCUSSION. Dr. Heckel was of the opinion that the impairment of vision was due to temporary paralysis of accommodation, a condition that he has seen occur before in diabetes; the blurred distant vision being due to the hyperopia.

Dr. Willetts stated that there had probably been temporary loss of accommodation. He has seen this occur many times in neurotic patients and in those whose special centers were exhausted from overwork. It might, in this case have been due to the generally impaired condition of the patient, secondary to diabetes or due to exhaustion of the centers and entirely independent of the existing diabetes.

Dr. Krebs had had two cases recently in which there had been blurred vision due to a rapid change in the errors of refraction coincident with an increased amount of sugar in the urine; both cases had been under observation for months. One of the cases had normal power of accommodation, but the other, a male of 29, had partial paralysis, the addition of $+2.00$ being necessary to read No. 1 Jaeger at 14 inches; a week later the accommodative power had become normal again.

ADOLPH KREBS, Secretary.

THE INVERTED RETINAL IMAGE.

The following two letters have been published at the request of Dr. Harman. The third letter was written at our request to present all sides of the subject.—[Editor.]

Editor *Medical Age*:

How the brain receives the impression erect has long been an unanswered question due probably to our imperfect anatomical knowledge and the simplicity of the reason.

It is readily explained by a twist or half-turn made upon itself by the optic nerve between the eyeball and the visual center in the brain. Thus it is seen that as the impression of the inverted retinal image is transmitted by the optic nerve-fibres to the brain, the half-turn made in their course places the image upon the brain cells in the erect position.

I am informed by the principal of the Shawnee, Ohio, public school that one of his pupils invariably draws everything upside down. His optic nerves are evidently malformed, the fibres running straight back to the brain instead of making the half spiral turn necessary to erect the image.

Respectfully yours,

G. A. HARMAN, M. D.

Lancaster, Ohio, April 10, 1894.

Medical Age, April 25, 1894.

Editor *Medical Age*:

Allow me to reply to criticism appearing in your journal of December 10th on my article in "Age" of April 25th, "The Inverted Retinal Image."

The reference to the Shawnee boy's optic nerves Doctor Spence characterizes as a "physiological crudity"; and yet it is apparent the suggestion I made may be true. The image is seen inverted in the camera a half turn erects it in the photo.

That there is a twist in the optic nerve, is a fact. In *Diseases of the Eye*, page 593, Noyes, in speaking of the nerve, says it is slightly twisted. According to the laws of physics a half turn or twist would bring the bottom fibres on top and take the top fibres to the bottom and certainly erect the "inverted retinal image" upon the brain, which is the matter of

chief concern to me, for the explanation of which I am claiming credit.

Very respectfully,

G. A. HARMAN, M. D.

Medical Age, January 25, 1895. Lancaster, Ohio.

P. S.—The author failed to see that a slight twist would place image at angle on the brain and it was left for the writer to see that a half turn would place an erect image on the brain.

October 19, 1915.

Editor OPHTHALMIC RECORD:

Appreciating the compliment conveyed by your kind invitation to express my opinion respecting the erect transmission to the brain of the inverted ocular images, I am taking the liberty to submit it, but without criticism of the opinions of others who are righteously trying to explain a more or less obscure phenomenon. First, because I am not an authority on physiology and secondly, because I have not had the surgeon's training and experience in making such dissections of the optic nerves and brain as would logically be necessary to determine the actual courses of the optic nerve-fibrils leading to their associated brain cells around the visual center so as to produce the so-called brain image, which is quite as imaginary as the suggested chiasmal image.

However, in the absence of definite knowledge as to such courses there does not seem to me to be any real necessity for concluding that either or both of these figurative images should be *erect*, since it would merely be required of the brain to interpret a retinal nerve stimulus above the fovea as being produced by light emanation from below the point of fixation in the object-space, and vice versa; the same being true with respect to the retinal nerve stimuli on the right or left side of the fovea. In this event, consciousness of the actual positions of objects would only need to be founded upon a mental process or habit instinctively acquired from visual experience gained during early infancy. In fact, there appears to be an initial period of "learning to see," during which the fond young mother often with glee proclaims that her babe is "taking notice," the evident result of the infant having learned to exercise the functions of accommodation and convergence; and the careful observer must also have noted that a baby first playing

with a rattle continually reverses the positions of its ends while transferring these extremities from one hand to the other, thus probably learning through aid of the sense of touch to associate the relative positions and forms of these parts of the toy with the corresponding mental impressions produced. Such reasoning on the part of the investigator will, of course, be effectively contradicted when it shall have been proven that a stimulus to a retinal nerve-end above the fovea finds its response in a brain-cell located below the visual center in the vertical plane, and which would be the case if the optic nerve-fibrils collectively suffered an *exact* half turn, but which no lesser turn or twist of the optic nerve could accomplish.

Therefore, until this anatomical arrangement shall have been definitely ascertained it would appear that either of the aforesaid theories should temporarily suffice to at least empirically explain the phenomenon of erect vision.

Very sincerely yours,

CHAS. F. PRENTICE.

DR. JAMES TAYLOR ON THE WORK OF HUGHLINGS JACKSON.

At the opening meeting of the Section of Neurology, Royal Society of Medicine, on October 28th, its President, Dr. James Taylor, dealt, in his address, with the work of Hughlings Jackson. The title of the paper was "The Ophthalmological Observations of Hughlings Jackson, and Their Bearing on Nervous and Other Diseases."

He said he did not think it could be easy for anyone who was not brought intimately into contact with him to understand the reverent affection always entertained by those who enjoyed that good fortune for the great personality of Hughlings Jackson. The speaker's object in this address was to stimulate interest in Dr. Jackson's writings, with their wealth of clinical observation, accurate scientific method, and broad philosophical grasp.

One of his earliest and most lasting interests was in ophthalmological and ocular conditions, and most of his early writings dealt with these, especially in reference to the symptomatology of intracranial tumours. Alterations in speech produced by disease also claimed much of his attention; and other departments of his activities included hemiplegia, chorea, and the syphilitic diseases of the nervous system, epilepsy, vertigo,

and associated ear states. Jackson's series of treatises on the evolution and dissolution of the nervous system, though severely scientific, were yet intensely practical. In nervous diseases he was never tired of insisting on the necessity of routine ophthalmological examination. In his paper, contributed in 1863, dealing with defects of sight in brain disease, he pointed out the occurrence of two kinds of atrophy: one in which the nerve gradually whitened, the other in which whitening followed certain acute changes, the latter being known as amaurosis. Emphasis was also laid on ophthalmoscopic examination in hemiplegia, and especially in seeking for evidence of Bright's disease, and in cases brought in comatose; and all the time he insisted on the need for preserving a philosophical balance of mind, so as to ensure that everything was seen in its true perspective. He set out, at length, his reasons for urging that ophthalmologists and alienists should do much work in common, for the evolution of movement and sensation could best be studied at an eye hospital. Amaurosis might be studied with too much intensity and at the same time with too little breadth. To the ophthalmologist it was a disease of such great importance, calling for particular action on his part, that he might underrate its significance as a symptom in general conditions of the system. It was when it occurred with other phenomena that the discovery of what it meant was most likely to be made. The ophthalmic surgeon could scarcely confine his thoughts to a single sense apparatus, however much his practice might be limited to the defects of that one. To the physician, defect of smell, though it might be less important, was of equal significance with defect of sight. Hemiplegia with its allies was the extra-ophthalmological symptom which chiefly deserved the consideration of ophthalmologists, because of the frequent occurrence of ocular or visual anomalies in association with it. Jackson regarded insanity as the very highest medical study.

As early as 1863, Hughlings Jackson wrote on the existence of optic neuritis without obvious defect of sight; but its acceptance in anything like a general way was only the result of constant insistence. He expressed the opinion that disease of the cerebellum, *per se*, does not produce blindness, neither does disease of the cerebrum, of itself, do so; but that tumour in either region did so by setting up optic neuritis, the result of local encephalitis. Lecturing on optic neuritis in 1871, Jackson said that the intracranial disease most often associated with

double optic neuritis is a coarse one, a lump of something, an adventitious product; and, further, that double optic neuritis did not point to any particular kind of coarse disease, only to some coarse disease. The condition scarcely ever occurred in chronic and general convulsive attacks, a condition of hemiplegia from local softening, etc.; and he pointed out that the optic neuritis was not a localising sign. He begged his readers to remember the three following points: (1) that optic neuritis frequently exists when the patient can read the smallest type; (2) that in cases of adventitious products in the cranium, the ophthalmoscopic appearances vary greatly, also at different stages in the same case; (3) that the use of the ophthalmoscope should never be omitted when a patient has severe and continuous headache. Hughlings Jackson's "Physician's Notes on Ophthalmology" were a storehouse of interesting record, and in them he insisted that intracranial tumour might be present without optic neuritis, that optic neuritis might be observed and yet no tumour be found, and, as already mentioned, that optic neuritis did not necessarily result in blindness, though there was usually great danger of it leading to impairment of sight.

In his Annual Oration before the Medical Society of London, in 1877, he recognized the importance of the effects which refraction errors might produce. Thus, hypermetropia might cause symptoms simulating those of brain disease, such as headache and squinting; and observation of hypermetropic discs was of the utmost importance because of the close resemblance they bore to the inflamed disc associated with tumour. In this address Dr. Jackson proceeds to show the inseparable connection of motor activity with sensory activity in ideation. They showed that whilst the color—the secondary or dynamical quality—of an object is a sensory affair, its size and shape—its primary or statical quality—is a motor affair. In the light of this, ophthalmological facts became of inestimable value, showing that the estimation of the extension of objects was due to motor activity, and that activity of motor centres would suffice. He points out that optic atrophy is important in reference to examination with the ophthalmoscope; it often occurs in *tabes dorsalis*, and in general paralysis of the insane. It might occur with or without pupil changes, with or without pain, with or without ataxy; and it was not a necessary sign in *tabes dorsalis*. Retinal embolism, revealed by the ophthalmoscope, might

be associated with cerebral embolism. The same instrument might render visible other tissue changes in the fundus, such as these resulting from tubercle, syphilis, or Bright's disease, though it was to be noted that the ophthalmoscopic appearances of Bright's disease were often closely simulated by those occurring in intracranial tumour.

At a very interesting discussion which Dr. Jackson participated in, reported in the first volume of the Ophthalmological Society's Transactions, he states his belief that there is but one kind of optic neuritis due to intracranial disease; also that uniocular optic neuritis rarely occurs in cases of intracranial tumour. He considered it important to distinguish between the development of neuritis and consequent loss of vision from a foreign body, and loss of sight from a destructive lesion. Thus, hemiopia was usually the result of a destructive lesion, and, in itself, implied no change in the fundus. In the ordinary hemiopia from hemorrhage or clot, fundal changes did not occur.

With regard to the question of the mode of production of optic neuritis, against von Graefe's view that it was caused by raised intracranial pressure inducing venous congestion in the central vessels of the optic nerve, was the fact that a small tumour might cause intense optic neuritis, whereas a large hemorrhage might not be accompanied by any optic neuritis. He regarded the view of Benedict as "the most plausible," namely, that of reflex vaso-motor action, inducing instability in the grey matter and influencing vessels in the optic nerves. A further plea for the early and systematic use of the ophthalmoscope rose from the fact that the best time for treatment of optic atrophy was early in its appearance.

Dr. Jackson's Bowman lecture before the Ophthalmological Society, in 1885, was a philosophical treatise on Spencerian lines, but with a practical side. In it he showed the benefit of co-operation of specialised fields of research and knowledge; he also dealt with the complexity of nervous diseases, such as epileptic paroxysms.

ERRATUM.

Through a clerical error in the report of the minutes of the Board of Examiners in Ophthalmology, published in the December RECORD, the name of Dr. Casey A. Wood of Chicago was given as representing the Section of Ophthalmology of the A. M. A. instead of Dr. Hiram Woods of Baltimore.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

The Arkansas Ophthalmological Society held its first meeting in Little Rock on September 14.

On December 7 Dr. Casey A. Wood spoke before the Chicago Ornithological Society on the subject of the Eyes of Birds.

The marriage is announced of Dr. Wm. Sweeny Stucky of Lexington, Ky., to Miss Anne Clay McDowell, on November 21, 1915.

The Opticians' League of New York met on November 17th under the presidency of E. B. Meyrowitz. Chas. L. Pilger was elected president for the ensuing year.

The Scott County (Kentucky) Health and Welfare Association announces the establishment of an Eye, Ear, Nose and Throat clinic in Georgetown under the direction of Dr. Edward C. Barlow.

Throughout the United States a most vigorous campaign for the prevention of blindness is going on, a phase of social and medical service which the ophthalmologists of the country should aid without exception.

The State Board of Health of Kentucky issued a bulletin last July dealing with eye subjects. The main feature is a presentation of the trachoma situation in that state, which is largely the work of Dr. J. A. Stucky of Lexington.

At the annual meeting of the Southern Medical Society at Dallas, Texas, on November 9th to 11th, the following were elected officers of the Eye, Ear, Nose and Throat Section: Dr. J. W. Jervy of Greenville, S. C., chairman; Dr. Thomas W. Moore, of Huntington, W. Va., vice-chairman; Dr. William T. Patton of New Orleans, La., secretary.

Dr. Harry Gradle of Chicago reports that he has arranged to have ethylhydrocuprein (optochin) made in Chicago by the chemist of the Econonical Drug Co. This product he has tried out clinically and has found it quite as efficient as the imported product, which it is practically impossible to obtain on account of the war.

Dr. Philip L. Coulter, who was D. T. Vail's assistant, has accepted a position in the U. S. Public Health Service as superintendent-in-charge of the Welch Trachoma Hospital, Welch, West Virginia.

This is a new hospital recently established by the government to control the trachoma epidemic, which is particularly prevalent in the mountains of the southeast."

According to a Baltimore newspaper, two monkeys are being fitted with glasses at the Johns Hopkin's with a view to producing serious impairment of vision. This is expected to cause profound nervous disturbance, manifested by abnormal functioning of the thyroid. From these monkeys curative substances will be recovered for persons afflicted with thyroid disease!

The National Committee for the Prevention of Blindness sends out a most interesting news letter dated December 1, 1915, at New York. A very successful meeting was held in New York on November 4th, at which Ex-President Taft and Dr. George de Schweinitz spoke. In Arizona the wide-spread trachoma infection is being rapidly controlled. The number of cases in the Schools of Douglass has fallen from 78 to 5 in one year. The situation in Kentucky has received frequent notice in these columns. No state has exhibited more energetic and successful interest in the trachoma scourge than Kentucky. In Massachusetts an important work is noted in the provision for boarding nursing mothers with infants having ophthalmia neonatorum, so that the babies can have the benefit of breast milk. The Massachusetts Eye and Ear Infirmary is doing this where possible, and when not possible to keep the mothers in the hospital provides breast milk as far as practicable.

The control of the sale of wood alcohol in New York City has reduced the alarming death rate and blindness formerly due to that cause. The results of 5,000 refractions by the health department are summed up in this important sentence: "In accordance with the observations of previous investigators, myopia or short sight is a condition rarely present at the beginning of school life, gradually increases with the age of the child, so that at the age of sixteen years, almost one-half of our cases had more or less myopia." In Ohio the Board of Education is providing for special instruction of children with eye defects which reduce vision seriously or cause distress.

An Association for the Advancement of Applied Optics was recently organized at Rochester, New York. Its membership will include general physicists, laboratory experts in optical problems and instruments, illuminating engineers and oculists. The advantage and need of co-operation of men in these allied professions has often been suggested for there are many practical problems relating to the welfare of human vision that can best be solved by united efforts. Therefore, it is to be hoped that the future of the Association will fulfill the aim expressed in its constitution, "to increase and diffuse the knowledge of optics, to promote the mutual interest of investigators of optical instruments and apparatus of all kinds and to encourage co-operation among them."

It is but natural that such an Association should have its origin at Rochester, New York, as it is the great optical center of this country. The officers of the Association are as follows: President, P. G. Nutting, Ph. D.; first vice-president, Herman Kellner, Ph. D.; second vice-president, Prof. Howard D. Minchin, Ph. D.; treasurer, Adolph Lomb; recording secretary, Lloyd A. Jones, M. A.; corresponding secretary, Frank E. Ross, Ph. D.; council: Elmer J. Bissell, M. D., W. B. Rayton, C. W. Frederick, F. B. Saegnüller.

NEW BOOKS

Annual Report of the Surgeon General of the Public Health Service of the United States, for the fiscal year 1914. Washington Government Printing Office, 1914.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A. M.	Richard S. Pattillo (P.-G.) C. W. Mahoney (Poli.) C. H. Francis (P.-G.) R. B. Stephenson (P.-G.) Carl Wagner (E. N. T.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.) A. G. Wippert (E. N. T.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.) Carl Wagner (E. N. T.)	G. W. Mahoney (Poli.) Richard S. Pattillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wippert (E. N. T.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. N. T.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippert (E. N. T.)
10 A. M.	Brown Pusey (N. W. U.) Geo. T. Jordan (N. W. U.) Robert Blue (N. W. U.) Every day, 10-12 A. M. Harry Gradle (E. N. T.)	J. R. Hoffman (E. N. T.)	Harry Gradle (E. N. T.)	J. R. Hoffman (E. N. T.)	Harry Gradle (E. N. T.)	J. R. Hoffman (E. N. T.)
1 P. M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenherr (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) I. B. Loring (Inf.) S. L. McCright (C. C. S.) Robt. Von der Heydt C. A. Leenherr (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) W. A. Fisher (E. N. T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenherr (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Bravley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Cassy Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring (Inf.) S. L. McCright (C. C. S.) Robt. Von der Heydt L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) W. A. Fisher (E. N. T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenherr (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.) W. A. Fisher (E. N. T.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) I. B. Loring (Inf.) S. L. McCright (C. C. S.) Robt. Von der Heydt L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) W. A. Fisher (E. N. T.) Oliver Tydings (E. N. T.)
3 P. M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M. H.)	W. Allen Barr (C. C. S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M. H.)	W. Allen Barr (C. C. S.)	Geo. F. Suker (P. G.) 2-5 H. Cuthbertson A. Duncan
4 P. M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 I. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	I. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) I. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street. E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St	County: Cook County Hospital, W. Harrison and Honor Streets. Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets. M. H.: Mercy Hospital.	Poli.: Chicago Polyclinic and Hospital, 221 W. Chicago Avenue. P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street. N. W. U.: Northwestern University, 2431 Dearborn Street.	Rush: Rush Medical College, W. Harrison and Wood Streets. St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue. U. of I.: College of Medicine, University of Illinois, Congress and coin Streets.
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NODULAR TUBERCULOUS EPISCLERITIS. (GAMBLE)

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TUBERCULOSIS OF THE EYE, WITH SPECIAL REFERENCE TO TREATMENT.*

BY

W. E. GAMBLE, B. S., M. D.,

CHICAGO.

[Illustrated with Colored Plate.]

With the fuller appreciation that intraocular tuberculosis is endogenous in its origin and is only one of the tuberculous foci within the organism, has come a persistent and sustained effort to treat the patient, as well as the eye itself.

The general surgeon's routine practice of a decade ago, of removing tuberculous tissue wherever found possible (joints and glands) has given place to a more conservative treatment, owing to the fear of general dissemination of the disease. Ophthalmologists have learned that operations involving the inside of the eye, as iridectomy to remove tuberculous foci in the iris, are not only dangerous to the eye but to the life of the patient. Von Hippel¹ would only undertake extraction of secondary cataract when the tuberculous eye had been free from irritation for two years. In the presence of glaucomatous increase of tension, if the use of myotics does not suffice, he considers Elliot's trephining less dangerous than iridectomy as being an operation of less magnitude and not so likely to occasion scattering of the bacilli.

Professor Hertel² considers enucleation warranted only first, in rapidly progressive cases threatening perforation of the cornea; and second, in cases in which the papilla and optic nerve are involved in the disease. (This I take it refers to the acute type.)

Dr. Geo. S. Derby³ of Boston, "We have handled some 50 cases of tuberculosis of the eye during the year (1909) and a number of others in preceding years and have never resorted to removal of the eye."

*This article is part of the Symposium on Tuberculosis of the Eye published in the January Record, but was unfortunately delayed by the preparation of the colored illustration.

Such procedures as the injection of air and placing iodoform and other drugs in the anterior chamber are of doubtful value. In this connection it is significant that in the experimental test by inoculation of the rabbit's eye, with tuberculous tissue the animal usually dies in two or three months from general infection.

The recognition that tuberculosis, especially of the chronic type, attacks all of the tissues of the eye-ball excepting the lens, is the fertile field in which the ophthalmologists now are busily working.^{1 4} It is this type of the disease that I will discuss in this paper.

Practically all of the inhabitants of the civilized countries are infected with tubercle bacilli and most of them recover spontaneously without clinical symptoms. In most parts of the body these healed areas can only be seen at autopsy; while, in the eyes, pigment and connective tissue deposits (choroidal patches) may with reason, in some cases, be ascribed to this cause.^{2 5} This spontaneous healing of infected areas is no doubt due to general resistance plus something that civilized man has acquired through generations of contact with the disease, which is generally spoken of as immunity.

Roemer⁶ has demonstrated that a guinea pig with tuberculosis cannot be reinfected and those of us who have used tuberculin upon tuberculous patients have observed that after its prolonged use the system does not react to diagnostic doses of old tuberculin. This want of response is of the nature of an immunity. In our patient, just how long and to what degree this increased resistance, produced by tuberculin, lasts we know little.

Rothe and Bierbaum⁷ have demonstrated that the injection of whole bacilli, killed by desiccation or by treatment with alcohol, injected intravenously into the cattle or horses in a dose of from 30 to 50 mgs. gave a prompt production of antibodies,

¹Regarding the results of the experimental work of Stock and others in injecting virulent tubercle bacilli into the jugular vein of animals, Axenfeld says, "They furnish a variety of clinical pictures of those chronic deep inflammations of the uvea, sclera and cornea so freely corresponding to the obscure chronic inflammations of these structures long ago designated by Michel as tubercular and which have such variable courses, often being quite benign."

²The experiments of Stock, Lagrange, Frederick and others confirm this view. Injections of virulent bacilli into the jugular vein of rabbits produce numerous hematogenous deposits in the choroid of these animals. Strange to say, these nodules become completely absorbed. (The healing process did not occur so often in the iris and ciliary body).

which reached its height on the 7th day and this protection against virulent bacilli lasted more than a month. These antibodies, tested, were the complement-fixing amboceptor and the precipitin.

Diagnosis.

In the diagnosis of tuberculosis of the eye the ophthalmologist's ability to see the pathologic changes make the diagnosis much easier than in other parts of the body. The clinical picture is often all that is necessary to make this complete, as tubercles in the choroid or nodules in the iris; yet we occasionally find obscure cases, the nature of which we are unable to make out with the ophthalmoscope, aided by the history of the patient.

The recognition that many heretofore unknown pathologic changes in the eye are of tuberculous nature has come through the use of the tuberculin-reaction test. This reaction, as is well known takes a three-fold form. The general reaction is of little practical importance to the ophthalmologist other than that he should appreciate fully the harm it may be possible to do to the organism. The fact that practically all of the human race have been infected with tubercle bacilli and that this reaction is positive in the healed cases as well as in the progressive, explains its uselessness. The skin reaction for the same reason is of little diagnostic value, except when it is repeatedly negative. However, the focal reaction, when it can be obtained, is specific, leaving no room for doubt as to the nature of the lesion.

Dangers of General Reaction.

In the early days of the use of tuberculin I think most of us have seen untoward results from the diagnostic dose. The writer saw a patient put to bed for several days from its use (4 mg. O. T.) and indeed several weeks passed before he fully recovered. If these transitory symptoms were the only harm produced by this reaction we would not be disturbed by the fear of its use; but there is accumulating evidence that these pronounced reactions are liable to cause general dissemination of the bacilli. This danger is greater in cases with tuberculous cavities and large tuberculous areas in the organism outside of the eye. One of the most trustworthy contributions in point is that of Dr. Lydia Rabinowitsch-Kempner^s read at the recent British Tubercular Conference.

She made the following experiment:—"I have recently in-

vestigated the condition of the blood in animals treated by tuberculin. As a preliminary experiment two guinea pigs, which had been respectively infected three and four weeks previously with tuberculosis, were taken and the blood examined microscopically. No tubercle bacilli were to be found. The animals were then injected subcutaneously with two and three grams of tuberculin respectively. Both animals died within twenty-four hours, when examination of the blood revealed tubercle bacilli lying singly and in heaps."

Bachmeister⁹, in Freiburg, has carried out similar experiments. He examined the blood in fifteen cases of phthisis in the human subject by the method of animal injection. He got four positive results. "The blood was taken from the patients at the height of the feverish reaction following the diagnostic use of tuberculin. In the cases of all four patients, animal injection before the administration of tuberculin gave a negative result. A connection, therefore, appears to exist between the occurrence of virulent bacilli in the blood and the tuberculin reaction. Since, through the diagnostic use of tuberculin, virulent tubercle bacilli may be caused to enter the blood stream, it behooves us to proceed cautiously with its administration."

Focal Reaction.

It is unfortunate that, as now practiced, in most cases it seems necessary to produce the general reaction in order to obtain the focal. However, there is evidence to the effect that the cases that respond to a small diagnostic dose are the ones that respond most favorably to tuberculin treatment (Sydney Stephenson.¹⁰) (Krickman, Rus, Kuhnt.³⁴). So that small diagnostic doses are gaining favor. A more careful study of the suspected tuberculous area, in the light of what we now know constitutes a focal reaction, makes it unnecessary to use the larger dosage in many cases.

Size of diagnostic dose:—von Hippel, in early days, (1906) used 1 mg. as the initial diagnostic dose. He¹¹ says in one case 1/50 mg. was sufficient to produce reaction of some duration. I think he still uses the same dosage. Dr. Wm. Campbell Posey¹² reports reaction both general and focal with 1/25 mg. O. T.

The author¹³ has seen typical focal reaction in tuberculous iritis, without general reaction, with the administration of 10/500 mg. T. R. He confirmed the reaction by using slightly

larger dose, 12/500 mg. T. R. two days later.

Sydney Stephenson¹⁴ on two occasions produced both general and focal reaction in cases of chronic irido-cyclitis by 1/1000 mg. T. R.

However, it must be remembered reactions general or focal from these small doses are rare.

Changes in Tuberculous Area.

It may be of interest to enumerate changes in the tuberculous area in the eye, by the tuberculin diagnostic test, as reported by workers in this field.

The focal reaction can best be studied in tuberculosis of the iris and consists in hyperaemia of the blood vessel about the tuberculous nodules, ciliary injection, especially in the region of the involved area. Keratitis punctata is occasionally seen. Professor W. Stock¹⁵ has added to this description. He says, "Focal reaction often times consists of tiny gray deposits or thickenings of the iris in the inner circle of that membrane." He considers this a positive sign of tuberculosis of the eye.

Haab¹⁶ has seen ciliary and conjunctival injection in one case of disseminated choroiditis and hemorrhage near papilla in another patient from diagnostic doses of tuberculin, thereby proving the etiology.

Dr. Gebb,¹⁷ from Professor Roemer's clinic reports a case a brief of which follows:—

"Vitreous liquified; contained numerous dense flocculi. The borders of the very much reddened disc, especially of the temporal side were indistinct. The vessels were not altered. A white area including the macula was present: also small whitish-yellow foci and glistening crystals were seen in the retina." Here he had local reaction from tuberculin in the form of hemorrhages in the course of the vessels traversing the white zone.

G. Tobias¹⁸ has seen fine grayish spots situated at different levels of the substance of the cornea as the result of subcutaneous injections of tuberculin. Best seen by the loupe.

Axenfeld¹⁹ and Stock by this test have found that the vitreous hemorrhage of young people which commonly accompanies retinitis proliferans is often due to tuberculosis.

In one of their cases the eye came to section. No tubercles were found, but changes in the endothelium of the vein through which the blood passed into the vitreous, were found, which, they think, were due to some toxin produced by

the tubercle bacilli in the organism. This he considers of great interest since hemorrhages in the retina during severe general infection have been held to be due to pus organisms and this case would indicate that the toxins of general tuberculosis may give rise to the same. Increased hemorrhage was the reaction.

Knapp²⁰ reports two cases of retinal tuberculosis; Case 1:—The ophthalmoscope showed a swollen and inflamed optic disc. The swollen nerve head seemed to be displaced by an ill-defined chorio-retinal area, up and in, surmounted by a small hemorrhage; up and out and next to a blood vessel, there was a superficial, round, white focus; a smaller though similar patch was to be seen below, a short distance from the disc. The macular region was occupied by a perfect star-like figure. The spokes were composed of glistening, silver interrupted lines. The diagnostic dose of 3 mg. O. T. produced two days thereafter many round, white areas about the disc and the larger retinal focus. He remarks that it is uncertain whether the tuberculin injection made these small foci ophthalmoscopically visible or whether they represented the dissemination of the general focus. He further says that rapid and continuous improvement under specific tuberculin treatment confirms the diagnosis of tubercular lesion.

Case II:—In this case the ophthalmoscope showed white exudate, composed of round areas which surround the course of the macular vein. This vessel was unevenly dilated and there were small hemorrhages on the exudate. 3 mg. O. T. was followed by focal reaction, vitreous haze.

A chronic form of choroidal tubercle, "Obsolescent tubercle," in strumous children, first described by Sydney Stephenson²¹ and considered by him to be tuberculous, has been definitely determined to be tuberculous, by use of tuberculin diagnostic test (T. Harrison Butler and Karl Koller of New York²²). The latter describes the reaction to be opacity of the vitreous; change of color of the tubercle, more reddish.

Post-Bulbar Tuberculosis of the Optic Nerve.

Miliary tubercles in the sheaths and septa of the optic nerve are not infrequently found.

Parsons²³ explains this by saying that, "Transmission by the lymph stream is probably the commonest mode of infection, so that the sheaths suffer most frequently and worst."

Tuberculous foci of a chronic type, occur in the sheaths of the nerve also and may be manifest in the eye in three forms as

a neuro-retinitis not unlike albuminuric neuro-retinitis and as an optic neuritis and as a retro-bulbar neuritis (Igersheimer). Mayou²⁴ reported a case of the former, he says, "There was probably a tuberculous mass in the optic nerve sheath. The fundus presented an exudative appearance such as seen in albuminuric retinitis, there being typical star figures at the macula. A few days later six or eight small episcleral nodules had developed in the neighborhood of the limbus.

The condition of the fundus rapidly cleared up under increasing doses of tuberculin T. R. and the nodules disappeared from the limbus."

The writer^{24a} reported (second case) a patient suffering with neuro-retinitis of the left eye in appearance not unlike albuminuric-neuro-retinitis, in which all the usual diagnostic tests were made with negative results. 2½ mg. O. T. used subcutaneously was followed by reduction in sight from 20/20 before giving the injection to 20/200 forty-eight hours after. The vision in the fellow eye remained the same as before the injection. The sight reduction lasted about four days, with return to 20/20 at end of that time. This patient was treated with T. R. for several months, the largest therapeutic dose being 1/100 mg. His recovery has been complete with 20/20 vision.

The other patient had optic neuritis right eye. All the usual diagnostic tests were made with negative results. Four mg. O. T. was given subcutaneously. Before the injection VR. 20/40. VL. 20/20. Forty-eight hours after injection VR. 20/100, and in the left eye the only change that occurred in vision was that in looking at black print the letters looked gray. The disturbance in vision in this case began about 17 hours after injection and lasted four days, the sight reduction being the greatest at about 48 hours after injection. Careful study of the fundus in both cases revealed no changes.

T. R. was subcutaneously used in doses not larger than 1/100 mg. twice a week for several months with the result that central vision of 20/20 each eye was secured. Some small relative scotomata are present in the right eye. Disc in right eye pale. There has been no recurrence in either case. Five years have intervened since treatment of second case and six years since the first.

This sight reaction must be considered in the nature of specific reaction and definitely proves these cases to be of tuberculous nature. The decided and prompt response to tuberculin

treatment is further evidence of the nature of the disease. That no changes were produced in these eyes by the tuberculin diagnostic test probably can be explained by the fact that the foci were not, in the main, in the septa of the nerve itself but in the sheaths, and also that the tuberculous foci were extraocular.

The acuity of vision of the affected eye in optic neuritis or neuro-retinitis of suspected tuberculous origin may aid in differentiating between involvement of the sheaths of the nerve (perineuritis) and of the septa in the nerve itself (interstitial neuritis). In the former the reduction will not be great (in the writer's case the vision was 20/20, in the other 20/40); while in the latter the reduction would be greater.

The field of vision may be not only a means of determining whether the foci are in the sheaths or in the nerve itself, but may also aid in locating the anatomical portion involved. Igersheimer^{24b} reported three cases, studied clinically, of unilateral tuberculosis of the orbital part of the nerve, as shown by central scotoma in each case. Purlscher^{24c} has treated three cases of unilateral retro-bulbar neuritis of suspected tuberculous nature with tuberculin, followed by marked improvement. Later in the course of the disease macular changes appeared in all three.

It certainly is of the greatest importance, not only to the integrity of the eye but to the life of the patient, that a definite diagnosis be made at the earliest time possible.

To my mind the tuberculin diagnostic test (1 mg. O. T.) is justifiable procedure in these cases, after other means of diagnosis have failed. This sight reaction test deserves further study by the profession in order that its value and limitation be definitely determined. The early observations of Koch, in his animal experimentation, to the effect that very large doses of tuberculin produce hyperaemia and softening of the tuberculous area, have very properly riveted our attention upon the dangers to the eye of its use. The scarcity of report of injury from this agent is surprising. In tubercle of the fundus, increase in number of hemorrhages in the tuberculous area and vitreous haze have been frequently reported. Increased oedema of the retina (Kraus and Buckner) has been reported. The final visual result was not given.

Two of the best studied cases of tuberculosis of the retina are reported by Knapp, as mentioned above, in which 3 mgs. O. T. were used without permanently harmful results. Many other cases might be cited of the harmless effect of this agent in

tuberculosis of the retina and choroid: thus it appears that the use of the tuberculin diagnostic test in tuberculosis of the retina and optic nerve is not the dangerous procedure to these tissues that was apprehended.

It is in tuberculosis of the cornea, that definite injury has been done by tuberculin. Von Hippel has seen necrosis of the superficial layer of the cornea in tuberculous keratitis produced by too large doses.

Focal Reaction Wanting in Many Cases.

Tuberculosis of the eye may exist without focal reaction being produced by tuberculin (Dodd and Lane²⁵) even in doses of 10 mgs. Von Hippel²⁶ enucleated an eye full of tuberculous masses, yet a general reaction to O. T. was only obtained at the sixth injection of 5 mgs. Derby remarks that in a very considerable number of cases the desired reaction does not occur. This is in accordance with the experience of the writer.

Rather commonly we must depend upon the therapeutic test as evidence that the disease is tuberculous. While a positive therapeutic test is of value in determining the nature of an eye lesion, there is often a suspicion in the physician's mind that the improvement is due to unknown causes. With the aid of clinical evidence of tuberculosis in the organism outside of the eye, this test would be convincing and lead to proper general treatment. Without this added evidence, the physician may not feel warranted in directing the patient to begin the expensive battle against a disease that he is not sure exists. Focal reaction in doubtful cases is to be sought for in order that definite diagnosis be made, that proper general treatment may be instituted and maintained to ultimate cure.

Drs. W. B. West, Helen Carnecross and the writer have under observation a patient suffering with a deep nodular scleritis (sclerosing keratitis) which has existed several weeks, resisting all kinds of treatment. A tuberculin diagnostic test of 1 mg. O. T. gave no focal reaction. Infinitesimal doses of T. R. have not prevented the eye from being lost. It is now soft and sight is gone. Later in the progress of the disease and before the tuberculin diagnostic test was used, there had appeared innumerable round, slightly elevated yellowish-white spots 3 to 5 mm. in diameter showing through the conjunctiva, described several years ago by Verhoeff^{26a}, considered by him as diagnostic of tuberculous scleritis. One of these spots was enucleated. Dr.

Franklin D. Smith found: "The specimen submitted for examination consisted of a translucent nodule approximately 3 mm. in diameter. The nodule is made up of small round cells, arranged about a non-cellular mass, resembling very much tubercle formation. It is beneath the conjunctiva."

Thus it appears that this subsequent condition is a nodular tubercular episcleritis, disseminated from the large, deep tuberculous nodule.

Phlyctenular Conjunctivitis and Keratitis.

This disease is undoubtedly endogenous in its origin. Microscopic studies and inoculation of fresh phlyctenules into the anterior chamber of a rabbit's eye (Axenfeld, Leber, Wagerman, L. Mueller, F. Mayou, Hertel) show absence of organisms of any kind. This finding, in addition to absence of tubercle cell formation, proves that it is not a tuberculous disease. However, that it is related to tuberculosis, the foci being elsewhere in the organism, has been the belief since Virchow's time.

Axenfeld²⁷ has this to say, that, "It is certainly not a tuberculosis. It is simply inflammatory, although there is an indirect connection between these local phenomena and general tuberculosis." Both Rubert and Weeker,²⁸ in previously infected rabbits with tuberculosis, produced phlyctenules by instillation of tuberculin and by staphylococcus; while no such result was seen in healthy animal's eyes. Whether a like result can be obtained in other chronic infectious diseases has not been determined, I believe. There is much evidence to the effect that this disease is not tuberculous in nature. It is not the purpose of this paper to discuss this phase of the subject.

It has been hoped that the tuberculin diagnostic test would throw light on this problem. General reaction has been observed in about 88% of the cases (Stock²⁹ and Derby³⁰); but since we know now that the same per cent can be obtained in the non-phlyctenulous patients of the same age, this reaction has little if any, value. No focal reaction has been obtained, so far as I am aware.

Tuberculin treatment has been tried and found wanting. However, Dr. Geo. S. Derby³¹ of Boston, takes a more optimistic view. He says, "Phlyctenular patients do not need tuberculin." But he further states that he believes that as a rule patients do better with it. It must not be forgotten that his patients were in hospital residence, formed into classes under a most careful and skillful supervision, so that harm to them from this agent

was avoided. Not so might it be in office practice or in out-door clinics.

The most hopeful promise of successful attack on this disease lies in the closing of infection atriæ, wherever possible. Enucleation of the diseased tonsils and the practice of scraping posterior nares in these patients often is more helpful than other treatment.

A common symptom of the disease is a curious perversion of the appetite, tea, coffee, candy and pastries forming the major part of the diet. A substitution of a dietary of proper food values is of paramount importance in building up a general resistance of the organism to this latent type of infection. Further investigation may show that this is often due to bacteria other than tubercle bacilli.

Treatment.

The knowledge that by well regulated diet, clean air and rest, a general resistance to the tuberculous process may be acquired has given the profession the most potent weapon in the fight against this disease.

However, general resistance comes slowly after weeks and months of treatment. In tuberculosis of the eye much harm and often destruction of this organ results before this is acquired. Fortunately, we possess in tuberculin a means of inhibiting the progress of the disease and curing it in many cases.

Von Hippel,³² out of his large experience, has called our attention to the fact of the common relapses of the disease, following, or in the course of, tuberculin treatment.¹

Among 75 cases of tuberculosis of the iris and ciliary body, relapses occurred in 15 and at intervals of from 3 months to 3 years after end of first course of treatment. In 115 cases of tuberculosis of the cornea, there were 12 relapses. In 18 keratoiritis, 3; in 8 cases of conjunctivitis there were 2 relapses. No relapses in cases of sclera or choroid. The total number of relapses were 32 out of 243 patients. A long interval must elapse before one is justified in considering tuberculosis of the eye definitely cured.

As has been shown, tuberculin in large doses produces a

¹Stock's³³ inoculation experiments showed that even in the stage of remission, cicatrization bacilli were present in the iris and these when inoculated in another animal could cause an inoculation tuberculosis. Axenfeld³⁴ interprets this by saying that "There was no attenuation, nor was there destruction of the bacilli; but a resting stage had been produced by incapsulation."

definite action upon the tuberculous area. Cumulative evidence seems to point to the fact that this is, at most, only of secondary therapeutic importance; but that the important curative effect lies in establishing an active immunity against the disease. The experiments and clinical experience seem to indicate that the antigenic substance is not so much in the filtrate O. T., but exists mostly in the body of the tubercle bacilli, an endotoxin. This was Koch's conclusion when he brought out T. R. A fundamental addition to our knowledge of this subject was given by Sir A. E. Wright many years ago, to the effect that infinitesimal doses ($1/5000$ to $1/2000$ T. R. and smaller) are all that is necessary to activate this antibody formation and that comparatively small doses often paralyze the power the organism already has of doing this.

The laboratory method of determining the opsonic index being impractical, the clinician must depend upon the symptoms resulting from its use for his guide to dosage. While the temperature curve is, in many cases, a delicate criterion for guidance, the writer is of the opinion that the clinical symptoms, in terms of a headache, malaise and loss of appetite, are often more delicate and less harmful a test; indeed, safety in the administration of this remedy lies in a dose far below that which produces untoward symptoms. On the contrary, a feeling of well-being, good appetite and increasing weight is good evidence that the patient is getting the proper amount of tuberculin.

The results obtained by von Hippel's dosage by gradual increase from $1/500$ mg. T. R. to 1 mg. must be classed as one of the greatest of therapeutic achievements and yet, in the light of Sir A. E. Wright's opsonic index work, confirmed by the experience of many clinicians we are not justified in beginning with so large a dose as $1/500$ mg. T. R.

Indeed, there are those of us who prefer the giving of infinitesimal doses $1/5000$ to $1/2000$ mg. T. R. long continued, to the von Hippel method of gradual increase, as being more safe and as efficient. Wright has shown that it is so very easy to paralyze this antigenic power and thereby defeat, in part at least, the therapeutic effect of this agent. One should feel his way before using larger doses.

There is no practical method of testing the antigenic power of tuberculin. In personal correspondence with leading manufacturers of tuberculins in this country on this point one says

"We beg to advise that we do not use any method of testing the antigenic power of our tuberculins. In fact we do not know of any reliable method for this purpose."

Regarding the deterioration of tuberculin one manufacturer has this to say, "Since we have no trustworthy means at present of determining the antigenic properties of tuberculins it is not to be expected that one can set with certainty a time limit on the potency of these products. While the concentrated T. R. and B. E. are not considered to be as stable as the concentrated old tuberculin, yet they are considered to be fairly permanent. As with bacterial vaccines, concentrated tuberculins are put up for a year's commercial life and new tuberculins are prepared at least once a year, so consequently no tuberculin when it is used should be over two years old. Whether this time limit is warranted or not, future work must tell, but so far as our knowledge goes there is no definite data to the contrary at the present time."

There are twenty or more kinds of tuberculin on the market. Rothe and Bierbaum³⁵ have examined most of these for antigenic power, in connection with their experiment on horses and cattle; they found some of these products had little or no antigenic power. It is to be hoped that their work foreshadows a practical method of testing tuberculin products, thereby standardizing this important agent, making its use more exact and reliable.

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A CASE OF UNILATERAL OPTIC ATROPHY, THE SOLE SYMPTOM OF A PITUITARY GROWTH.

BY

FREDERICK KRAUSS, M. D.

PHILADELPHIA.

H. B. 24 years of age, single, gold beater by trade, was referred to me by his physician in July, 1913, on account of failing vision in the left eye, noticed for three weeks. He had no pain or general symptoms, other than a tiredness and sleepiness. He smoked three cigarettes daily, but did not drink intoxicating liquors. He had a slight cold in the head, but no headaches.

Family History:—Grandparents died at good age. One cousin had goitre. Father had always been a heavy drinker of beer. Mother—good health. One brother died at the age of two years, after suffering from purpura beginning at the age of seven months. One brother at the age of eighteen years, having been treated for tuberculosis for over one year, developed enlarged glands in the neck, and died rather suddenly. The postmortem showed enlarged glands all over the body. The liver and spleen were similarly affected. Another brother died at the age of 21 suffering from Hodgkins Disease.

Personal History:—He had always enjoyed good health, being active in outdoor sports. He is physically well developed, about 5 ft. 9 in., weight 160 lbs. There are no marked enlargements of hand or foot, or other indications of acromegaly. Glandular swellings are absent. When first seen July 17, 1913, the vision of the right eye was 5/6, and in the left eye excentric vision only. The cornea was clear in both eyes, the

pupils responding equally and freely to light, accommodation and convergence. In the right eye the fundus was normal. In the left eye the media were clear, the optic nerve grayish, decidedly off color, but not atrophic. The vessels were normal in size, the retina normal, except in the macular region, which appeared slightly fluffy. The field of vision in the right eye was normal. In the left eye there was a temporal hemianopsia in the scotoma of which, large white objects could be dimly seen. There was an absolute central scotoma of 10 degrees, except to the nasal side where it was about 8 degrees. The red field occupied a small irregular area on the nasal side. The nasal sinuses were apparently normal. On July 9th, the vision in the left eye was 4/40, the right eye 5/6. An examination of his nasal sinuses failed to disclose any cause for the nerve lesion. The distinctly unilateral character of the affection and

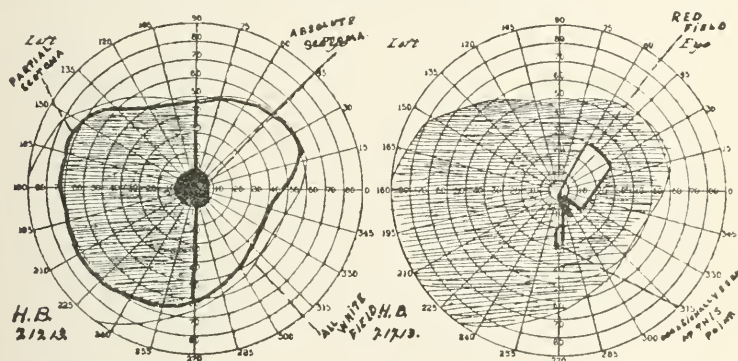


Fig. No. 1.

absolute absence of general symptoms were mystifying to his physician and myself, until the X-Ray examination showed a very considerable enlargement of the sella turcica. Wassermann tests were negative.

The patient's general health was excellent. He was given the mixed treatment by his physician, under whose observation he continued.

Under faradic and galvanic stimulation the vision in the left eye gradually improved to 5/12, with the peripheral field nearly normal, a large absolute scotoma remaining to the temporal side of the fixation point. On August 1st, the vision was 5/15, the patient stating that his vision in the left eye fluctuated greatly, being very good at times. On Sept. 6, 1913, the vision in the right eye was 5/5, in the left eye 5/9 partial. He was able to recognize small colored lights 10 mm. in diam-

eter at 5 meters. He was seen again on October 18, 1913, when the vision in the left eye had dropped to 5/20. The optic nerve was very pale with beginning atrophy. The field of vision showed an absolute temporal hemianopsia with encroachment upon the nasal side below fixation. The right field was normal.

He was seen again on January 17, 1914, when the optic nerve was seen to be gray white, markedly atrophic with some contraction of the vessels.

The retina was normal. The field of vision is reduced to a small area down and to the nasal side, with faint visual perception of large objects to the temporal side near the lateral periphery. In the right eye the vision was 5/3, with full visual field especially red. The visual field in the left eye had gradually decreased. Early in February the patient noticed that

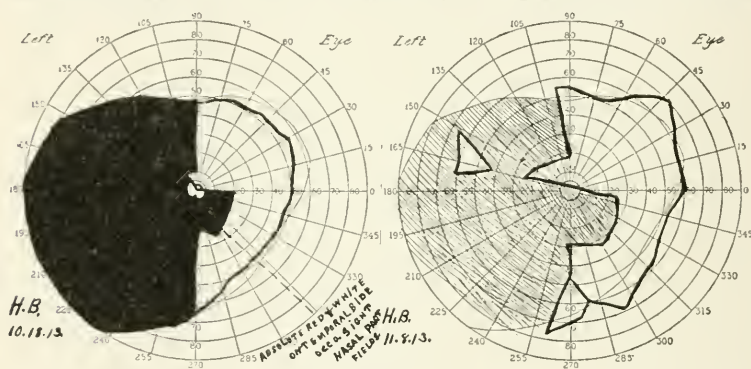


Fig. No. 2.

there was a marked loss of hearing in his left ear. He thinks that he has always had slightly less hearing in the left ear, but is uncertain as in 1909 he successfully passed an eye and ear examination for a railroad position.

The hearing in the right ear is watch at 30 inches. In the left ear, it is barely heard on contact. Hearing is not affected by Politzerization. Ear drums were practically normal in both ears, showing no atrophy or marked retraction.

The tuning fork on vertex is heard only in the right ear. Bone conduction is much less than air conduction. The duration of sound in bone conduction is very much less than normal, the tuning fork being heard when placed on the opposite mastoid, long after it had ceased to be heard on the left side. Therefore the Weber, Rin   and Schwabach tests indicate a nerve lesion of the sound perceiving apparatus of the left ear.

The patient has been steadily employed, and aside from his left eye, he feels that he is in perfect health.

A study of this case presents a family history of enlargement of the lymphatic glands and a blood dyscrasia. We have evidence of a growth of the pituitary body with great enlargement of the sella turcica. The only pressure symptoms are those of the eye and lately of the ear. Sleepiness and sexual apathy are very slight. The patient feels in excellent health. The patient claims to have some difficulty in lacing his shoes in the morning, but he still wears the same size shoes and gloves. There was no increase in weight or height. The pressure of the growth caused at first a temporal hemianopsia on the left side, with some diminution in vision in the opposite eye. Through temporary relaxation of pressure, perhaps assisted by the mixed treatment and electric stimulation of the

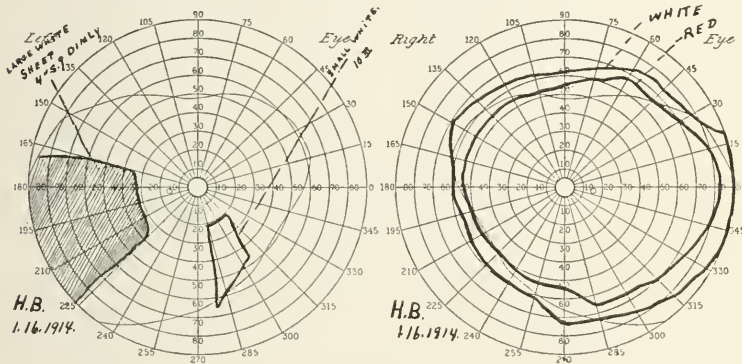


Fig. No. 3.

optic nerve there was a temporary increase of the vision lasting several months. Then the pressure reappeared with almost complete loss of sight in the left eye. The right eye in a recent field shows a slight cutting of the red field, though the form field is still perfect. The involvement of the auditory nerve would indicate a downward and backward extension of the struma, causing pressure.

The visual fields in this case are most characteristic. Beginning as a temporal hemianopsia in the left eye, and with absolute central scotoma for all colors it improved greatly under treatment. Colors could be recognized, though a paracentral scotoma remained. The distant vision naturally improved, likewise. There was a characteristic instability of vision, varying from hour to hour.

A sudden extension of the tumor with its increased pres-

sure caused a reappearance of the temporal hemianopsia with involvement of the nasal field from the center, toward the periphery, which is characteristic of the optic atrophy due to a chiasmal lesion.

The ocular findings in disorders of the pituitary body have been very largely in the nature of a simple atrophy of the optic nerve, a swelling of the disc or choked disc being very rare. Cushing is thereby led to the belief that the amblyopia associated with optic atrophy in this disease represents a physiological blocking of the light impulses rather than a destruction of the nerve fibres. He has observed immediate return of vision in previously blind eyes by the opening of a hypophyseal cyst, also a return to a normal field in a case showing bitemporal hemianopsia.

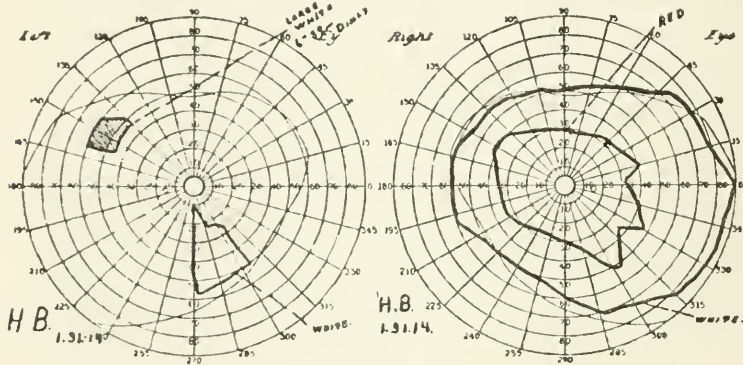


Fig. No. 4.

It has been supposed that a bitemporal hemianopsia was the characteristic perimetric picture of pituitary disease.

Cushing's analysis shows that homonymous defects or tendencies in this direction are at least half as frequent as bitemporal hemianopsias. In three such cases postmortem examinations showed that the glandular struma had burst its capsule and extended upward along the left side of the chiasm in two of them, producing a right homonymous defect and in the other case to the right side with a left homonymous defect.

Cushing further dilates upon the necessity of early recognition of temporal defects of the field in all cases, calling attention to the early involvement of the color fields. The form fields are later involved.

J. H. Fisher and Arnold Josefson have observed in twenty cases that temporal fields almost invariably appear to be lost

from above downwards. Oculomotor palsies and slight nystagmus have been observed. Exophthalmos is present in many cases, probably due to over-growth of the bony tissue of the orbit.

After a prolonged ineffectual treatment with thyroid extract as suggested by Dr. Geo. E. de Schweinitz and further involvement of the right eye, the patient decided to risk operative interference. He was examined by Dr. Charles H. Frazier, who states that his neurological examination was fairly complete, but "I was unable to find any disturbance of any of the cranial nerves except in so far as the optic and auditory nerves are concerned. So far as the upper and lower extremities are concerned, I can find no disturbance either motor or sensory, and the reflexes are in all cases normal. The absence of headache is rather interesting, in view of the fact that the X-Ray,

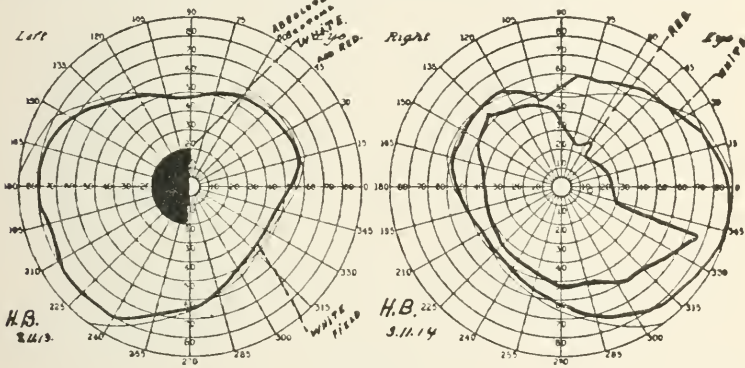


Fig. No. 5.

and from what I can understand, your reports point pretty definitely to a lesion of the pituitary body.

"There seems, however, to be no symptom of either hypo or hyperpituitarism, but only those that can be accounted for by direct pressure of an enlarged gland."

The patient was operated upon at the University of Pennsylvania Hospital on March 31st and April 1st, in two stages, by the submucous resection route by Dr. Charles H. Frazier under local anaesthesia.

Notes Dictated by Dr. Frazier at Operation, University Hospital, March 31, 1914.

Sellar Decompression. Local anesthesia, 10% cocaine and 1/1000 adrenalin. Moderate deflection of the septum to the left. Septum was resected sub-mucously without perforation, back as far as the vomer. With the use of the chisel, an at-

tempt was made to remove this vomer, but only a very small wedge-shaped portion was chipped off. The vomer did not separate as readily as in the other cases. As a matter of fact, this made little difference because in this particular case the entrance of the base of the sella was really above the base of the vomer. With the chisel the sphenoid sinus was opened at the roof when a membrane could be seen which was thought to be the mucous membrane lining the roof of the sphenoid sinus. A grooved director was introduced and the patient sent to the X-ray laboratory. The development of the plates showed that the grooved director had penetrated the sella itself, so that the first stage of the operation had really accomplished more than we had anticipated, and had we known the precise position of the end of the grooved director we could readily have

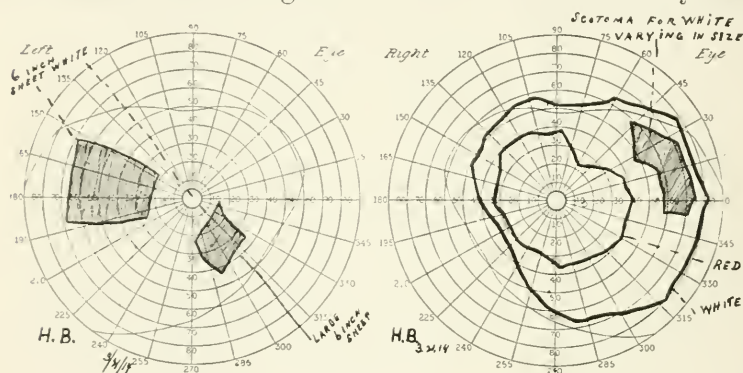


Fig. No. 6.
Before operation.

concluded the operation at one sitting under local anesthesia.
Notes Dictated April 1, 1914.

Sellar Decompression. The packs of bismuth gauze were removed. Cavity disinfected. Skin surrounding the nasal orifice painted with iodine and the nasal cavities cocainized with a 10% cocaine solution and 1/1000 adrenalin, and 1/4 gr. morphine given hypodermically. It was decided to conclude the operation if possible under local anesthesia, so a general anesthetic was not administered. It was first thought that the cavity of the sella was exposed but subsequently this proved to be the flattened sphenoidal sinus, so that it was necessary with a chisel to remove the floor of the sella. An opening about the size of a ten-cent piece was made. This exposed the pituitary, which had the soft gelatinous appearance of granulation tissue. A portion of it was removed for microscopical ex-

amination and no attempt was made at radical removal. The patient stood the operation well. Occasionally complained of an uncomfortable sensation at the top of his head when we were chiseling the floor of the sella. Dr. Magoffin made some blood pressure observations while we were manipulating the pituitary. No apparent change while the tissue was being removed. At the conclusion of the operation Dr. Landon introduced two sutures to close the septal wound and the nares were packed on either side with bismuth gauze. The patient was given an extra dose of morphine during the operation but no stimulation.

Dr. Frazier further states that contents of the sella presented the appearance which we have observed in cases of hyperplasia of the pituitary body rather than tumor, but I don't place a great deal of reliance upon the naked eye appearance.

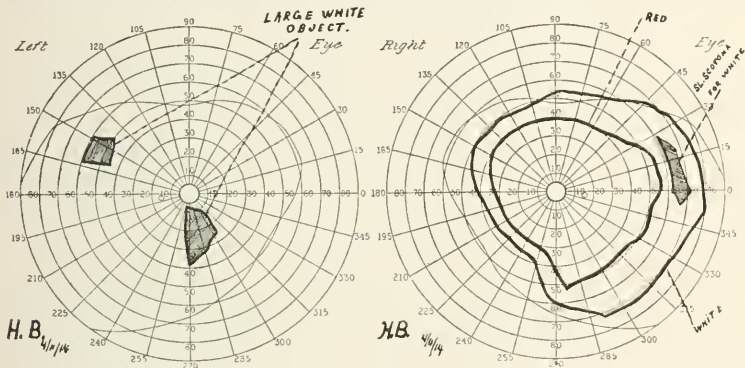


Fig. No. 7.
Ten days after operation.

The floor of the sella was removed and a portion of the pituitary body taken away for histological examination. The histological examination from the laboratory of the University of Pennsylvania is as follows:

"Specimen:—Hypophyseal Tissue.

Pathological Diagnosis:—Struma of the Pituitary.

Specimen consists of some small bits of dark brown friable tissue.

Microscopically, specimen consists of masses of blood clot, fragments of dura and small bits of hypertrophied pituitary tissue. Fragmentation renders description difficult. blood spaces are seen and many acini containing colloid. The prevailing type of cell is the scyanophilic, hence the tissue is from the periphery of the anterior lobe of the pituitary. Also there are many small refractile bodies scattered throughout all por-

tions of the tissue, having the microscopic characteristics of psammoma bodies."

The patient was seen by Dr. Krauss on April 11th, 1914, ten days after the operation and immediately after his discharge from the Hospital.

The convalescence had been rapid and uncomplicated. His field of vision for red in the right field had increased fully ten percent on the temporal side, and the relative scotoma for white reduced in size. In the left eye he had color perceptions in the lower nasal quadrant with a small field for white which had been absent at the previous examination.

On the following night he had a severe headache, becoming unconscious, and dying on April 13th at the University Hospital, to which place he had been removed as quickly as the diagnosis of purulent meningitis had been established.

No postmortem was permitted.

Dr. Frazier believes that a fresh infection from the nares following his discharge from the Hospital, had occurred as he had had no febrile reaction at the Hospital.

The unfortunate ending of this case was particularly distressing because, aside from his eye symptoms, the patient was in apparent good health, working at his trade until the day of operation.

On the other hand, he had become blind in his left eye and was rapidly developing optic pressure symptoms on the opposite side. The patient refused to run the chance of blindness and dependency.

A study of the accompanying fields is very instructive. In July, 1913, there was a large normal field in the right eye with hemianopsia (partial scotoma) in the temporal side, with an absolute central scotoma reducing vision to hand movements excentrically. Temporary improvement in August was followed by absolute temporal hemianopsia with involvement of the nasal field. A slight improvement in November was followed by complete loss of vision except in isolated regions. In January, 1914, the right field had remained normal until about the 31st, when the red began to show a cutting to the temporal side. In March the upper temporal quarter of the field for red was much involved. By March 21, 1914, there had developed a beginning scotoma for white in the temporal field. Some improvement is noticed in the last field, taken two days before the patient's death.

DETACHMENT OF THE RETINA IMPROVED IF NOT CURED.

BY

CLARENCE LOEB, A. M., M. D.

ASSOCIATE PROFESSOR OPHTHALMOLOGY, ST. LOUIS UNIVERSITY.

When we consider the generally pessimistic attitude of the medical profession toward retinal detachment, as exemplified by Vail's paper, any case whose treatment resulted in a distinct improvement, if not a complete cure, becomes worthy of record. It is such a case which I desire to relate.

Mr. G. W. K., age 44, a cutter, consulted me July 29, 1914, with the following history:

Five days previously, he found, on awakening in the morning, that he was unable to see well with his right eye. Since then, vision has somewhat improved, especially to the right and above. Sometimes he can see straight ahead of him, but the object quickly disappears. There was no history of trauma or headache. His general health is good. He is a well built man, rather inclined to corpulency. Patient denies lues, and there is no reason to doubt his statement. His family history is good except that his father died of cancer.

L. E., vision 6/6; R. E., sees only the letters which are to his right. As it was necessary for the patient to go to work, I was unable to proceed any further with the examination, and I made an appointment for two days later.

7/31/14. The field of vision taken on this date showed a contraction for white all around. The quadrant comprised between 180° and 270° is also entirely gone. The fields for red and green correspond very closely to that for white.

Examination of the fundus showed a broad detachment of the retina starting about four disc diameters temporal to the disc and extending in an irregular area upwards, downwards and peripherally.

I explained to the patient the gravity of the condition, and the unfavorable prognosis. Since it was absolutely impossible for him to stop work, the following treatment was instituted.

First. He was instructed to make hot applications to his eye several times a day; second, every night to take a sweat; third, 10 grains of potassium iodid with one-half grain of citrate of iron three times a day. Every morning a glass of magnesium citrate. Every other day I injected subconjunctivally a drop

of a two per cent sodium chlorid solution, while on the alternate days, the patient was instructed to instill a drop of a ten per cent dionin into the eye. Unnecessary use of the eye was forbidden. The patient was forbidden tobacco and alcohol in all forms, also instructed to drink as little water as possible.

The above treatment was on the whole faithfully carried out. Occasionally the patient would neglect his sweat, or take a glass of beer, or smoke a cigar, or it might be necessary to substitute dionin instillation for subconjunctival injection of the salt solution, but the above treatment may be credited with the good result obtained.

On August 13, the patient was able to read all the letters on the 6 M. line with an effort. On August 16, vision was the same. The visual field was almost normal, except in the affected quadrant, which however, showed an improvement.

From this time on, the condition of the eye showed a distinct improvement. The amount of visible detachment became less, and about the middle of September, I was no longer able to make it out with certainty. Corresponding to this, the visual field increased in the affected quadrant until on October 1st, there was a loss of less than one-half. However, there was a scotoma for white, red and green, starting near the center and extending in a wedge shape downward and inwards.

At this time, the patient was compelled to leave the city and I did not see him again until October 28th. Meanwhile, he had been under the care of another oculist with whose treatment I am unacquainted. The fields increased, but the scotoma was about the same size, although its location had shifted somewhat.

Since that time I took the visual fields November 15, December 15, January 26, and March 28. There has been a gradual decrease in the size of the scotoma until March 28, when it was so small as to be negligible. For a long time it had not annoyed the patient, and could be found only by careful examination. His central vision is $6/6$; refraction $+0.5$ S., and he is wearing $+1.5$ S. correction for near vision.

After the beginning of this year, his treatment consisted only of hot applications to the eye with daily instillation of ten per cent dionin, replaced occasionally by a subconjunctival injection of a two per cent salt solution. Since his discharge, March 28, has had no treatment. The fundus, during the last three months of treatment occasionally showed a waviness in the

course of the retinal vessels nearest the site of the detachment, but there was no gross lesion.

At my request, the patient presented himself September 12, 1915, for examination at which time I took the field of vision with the following result:

The field for white is slightly contracted above and nasally. The field for green is again larger than that for red, and also larger than normal, approaching the white. On the other hand, the paracentral scotoma is larger than the last time; also there is a scotoma for white, which had not been present for some time. I instructed the patient to start the sweats and purging again, and expect the scotoma to decrease.

The fundus showed a slight waviness in the region of the previous detachment, otherwise being normal. The vision was 6/6 without difficulty.

There are several interesting features connected with the case, which I should like to mention.

In the first place, there is the almost invariable excess of the green fields over the red, at times approaching the white in extent. The patient is a very intelligent man, and the tests were carefully taken, so I am convinced that he correctly reported what he saw. The size of the test objects was the same and the colors used were Pergen's. The green was always taken after the red, so there is no question of fatigue in the case of the red. In the fields of vision taken in the case of other patients, the normal relationship between the two colors has always been maintained as far as I can recall, certainly in all the records I have examined.

Secondly, the success of the depletion method. Sweats, purgatives and dionin, certainly cause loss of water from the body. The amount of potassium iodid given was too small to cause any great result had syphilis been present. Its action and that of the iron was, I think, chiefly alterative. The subconjunctival injections also caused local elimination. Incidentally, the patient lost over 20 pounds during the active eliminative treatment.

Third, at no time was the patient confined to his bed. He performed his usual occupation and even left the city for a trip.

Fourth, I have recently had another patient, to whom I gave the same treatment, with the additional treatment of keeping the patient in bed on his back. The result was abso-

lutely no improvement, detachment visible through the undilated pupil, the retina hanging down in the characteristic fold, while in the case of Mr. K. the outlines could be made out only after the pupil was dilated, and then it had more of the appearance of a raised surface than a large detachment.

From this, I would conclude that this treatment to be effective must be started during the early stages of the detachment before it has increased to such an extent that the diagnosis can be made by watching the pupil as the patient moves his eyes up and down and side to side.

A SIMPLE TONOMETER FOR CLINICAL USE.

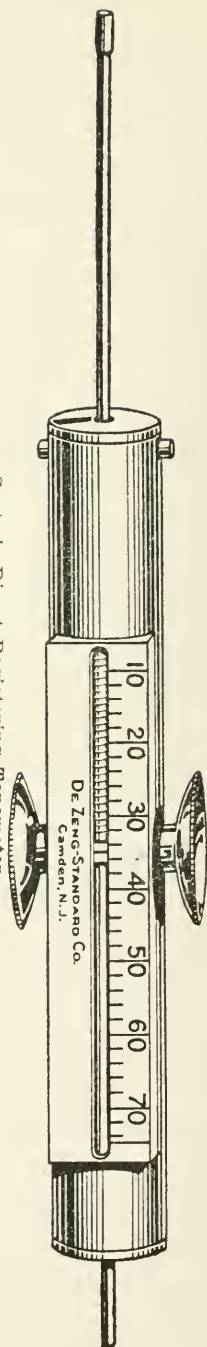
BY

WM. NORWOOD SOUTER, M. D.

INSTRUCTOR IN OPHTHALMOLOGY, HARVARD UNIVERSITY, BOSTON.

The importance of measuring the tension of the eye more accurately than is possible by palpation is recognized by all ophthalmologists. The Schiötz tonometer has filled a much felt want, but its high cost and the difficulty of applying it in nervous patients have prevented its general adoption as a clinical instrument. The tonometer here illustrated is constructed on the principle of a spring weighing scale. It is held horizontally and gently applied to the summit of the cornea until indentation of the latter occurs. Daylight is preferable, the patient sitting or standing near a window, but artificial light may be used if necessary. I have found an electric head-light very convenient when sufficient daylight is not available. The patient looks straight forward while the examiner places himself so as to obtain a profile view of the cornea, being on the

Souter's Direct Registering Tonometer.



right side of the patient for the right eye and on the left side for the left eye, holding the instrument in the right hand for the right eye and in the left hand for the left eye.

When the examiner sees the indentation of the cornea he slightly increases and diminishes the pressure and observes a to-and-fro movement of the corneal apex. Having thus determined the balancing point between the tension of the eye and the spring, he notes the position of the pointer on the scale, this being graduated in millimeters of mercury.

In many cases this tonometer can be applied without the use of an anesthetic, but in nervous patients and in sensitive eyes it is better to instil a few drops of a solution of holocain or other anesthetic.

The markings on the scale were gauged by applying the tonometer to rabbits' eyes which were connected with a manometer.

While there is some liability to error of observation on the part of persons inexperienced in the use of the instrument, I have reason to believe that in practiced hands it affords, all things considered, as accurate a means as any other available for the measuring of tension in the diagnosis of glaucoma. It cannot be used satisfactorily, however, in the exact measurement of subnormal tension.

I have limited the highest registration to 75 mm., because to carry it further would necessitate an inconvenient length of the instrument. A duplicate with a stronger spring could be made for measuring very high degrees of tension, but practically it suffices for us to know that the tension of an eye reaches or exceeds 75 mm.

I am indebted to the De Zeng Standard Company for the overcoming of certain mechanical difficulties in the construction of the instrument.

CORNEOSCLERAL SUBCONJUNCTIVAL SETON IN GLAUCOMA SIMPLEX.

BY

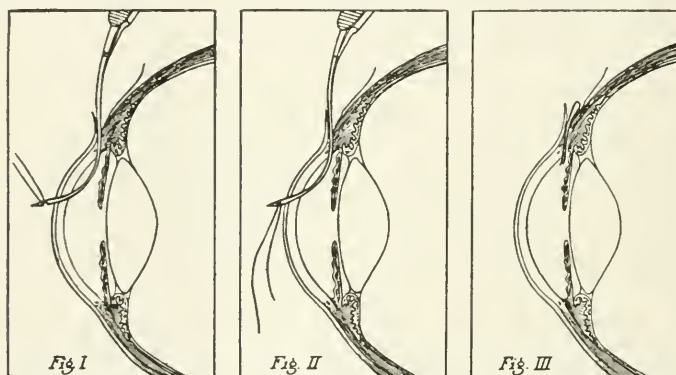
K. K. WHEELLOCK, M. D.,
FORT WAYNE, INDIANA.

In presenting this modification of the Zorab subconjunctival seton and the corneoscleral seton of Casey Wood I do it for the purpose of simplifying both methods and at the same time adding to the effectiveness of the principle. What the

ultimate effect of a sterile thread lying in the anterior chamber may be we have no means of knowing.

But we do know that the ultimate effect upon the eye of unrelieved pressure within is blindness and probable loss of the eye-ball. There seems no good reason to doubt that a thread lying in the anterior chamber of the eye according to the method about to be described might effect a permanent drainage by reason of creating a fistulous tract in the tissues, and in case of untoward effects arising from the pressure of a foreign body the thread may be easily removed. It is admitted that a permanent fistula offers the best opportunity for relief of increased pressure within the eye-ball.

If the corneoscleral subconjunctival seton creates a permanent drain outward from the anterior chamber it would not be



Wheelock's Corneoscleral Subconjunctival Seton in Glaucoma Simplex.

material whether the distal opening of the newly created channel extended into the air or into the subconjunctival tissues. Opening into the subconjunctival tissues would be a great protection against infection.

The simplicity of the technic of my operation recommends it, while its value as a therapeutic measure remains to be demonstrated. The initial entrance into the anterior chamber is made as in the Herbert operation, i. e., the conjunctiva is dissected from the sclera down to the corneoscleral margin, thus leaving a subconjunctival pocket. A Graefe cataract knife is passed through the subconjunctival pocket into the sclera 1 mm. behind the corneoscleral margin and into the anterior chamber, the incision so made should be four mm. in length. A Riverdin needle is next passed through the subconjunctival pocket into the anterior chamber and through the incision

previously made by the cataract knife. The Riverdin needle made for me by V. Mueller & Co., Chicago, has a very sharp point and a double cutting edge, so that the minimum of trauma is caused. The needle is a quarter curve and passes through the cornea closed. The eye is then opened by the thumb-push in the handle and an assistant lays a loop of "00" braided white silk thread in the opened eye—Fig. I. The eye of the needle is then closed as in Fig. II and the needle, loaded with the thread, is withdrawn.

When the needle emerges from the subconjunctival pocket the eye is opened and the loop of thread disengaged from the needle. The double thread now lies in the subconjunctival channel and anterior chamber with the double loose ends upon the cornea; the loose ends are now cut off flush with the cornea and the double thread is drawn into the anterior chamber, and as much of the thread may extend into the anterior chamber as seems advisable. Fig. III. The conjunctiva may be closed over the loop of thread in finishing the operation.

If it is advisable to have a larger size thread than the "00" in the wound it may be introduced in the following manner: After the "00" thread has been placed in position and before the distal ends lying upon the cornea have been cut, the loop end in the subconjunctival pocket may be threaded with any desired size thread; then by seizing the loose ends of the thread lying upon the cornea, the second loop may be drawn into position in the anterior chamber and one thread lying upon the cornea cut flush with the corneal surface; traction upon the larger loop will draw the first loop into the anterior chamber, when the short end of the "00" loop will become free and slide through the second loop and may be drawn through the corneal wound. By gentle manipulation the larger loop may be drawn as far into the anterior chamber as is deemed necessary to secure open drainage and maintain a fistulous tract.

SUBCONJUNCTIVAL RUPTURE OF THE EYEBALL.

BY

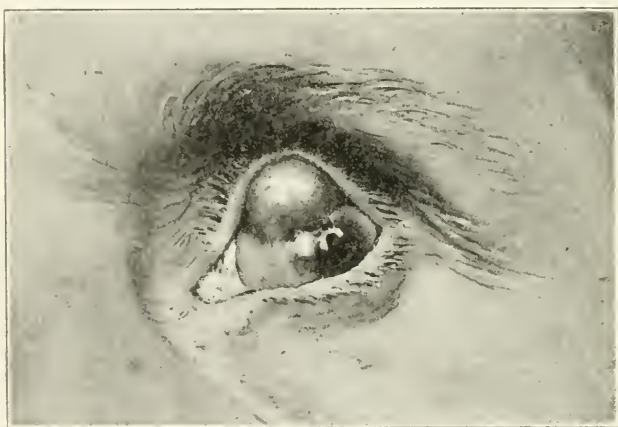
EUGENE BLAKE, M. D.

NEW HAVEN, CONN.

A rupture of the eyeball subconjunctivally is not an especially rare condition, but the following case was so striking and shows so well in the photograph that it is briefly reported.

The patient, a Polish woman of 46, came to the Ophthalmic

clinic of the Yale Medical School on July 14, 1915. Seven weeks previously, while performing her house work, she slipped and fell, striking her left eye upon the knob of a chair back. When first seen by the writer the eye was white and free from inflammation. There was a translucent, globular swelling about 1 cm. in diameter, situated just above the limbus in the upper and slightly nasal quadrant. The iris was drawn up in this location and presented an appearance as though an iridectomy had been performed. The anterior chamber was very deep, the tension much below normal. The iris was not tremulous, probably because it was so firmly drawn up into the wound. Behind the iris was a blood clot, prevent-



Subconjunctival Rupture of Eyeball.

ing any view of the fundus. No trace of a lens could be found either because it was back in the vitreous or because it had previously been absorbed. The eye had once before been struck and sight practically destroyed.

Palpation and transillumination failed to show the presence of the lens in the conjunctival swelling. Vision was reduced to uncertain light perception.

As the patient entered the clinic room she presented the appearance of having a large chalazion in the left upper lid, but upon raising the lid the true condition was recognized.

On account of the danger of sympathetic trouble and because of the deformity, enucleation was advised but refused. My colleague, Dr. E. M. McCabe, who treated the patient before she came to the clinic and to whom I am indebted for part of the history, counselled similar treatment.

CILIA IN THE ANTERIOR CHAMBER.

BY

CHARLES P. SMALL, M. D.

CHICAGO.

Because of the exceedingly rare occurrence of cilia being forced into the anterior chamber as the result of some ocular trauma, and because of the peculiar significance of this form of injury, the following case from the practice of Dr. Frank Allport, is of interest.

T. E., a section-hand, while at work driving railroad spikes, broke the head of a spike, a piece of which flew up and struck his right eye, lacerating the cornea to the extent of about 10 mm.; the iris was slightly torn, and there was a slight prolapse of the latter into the corneal wound; a traumatic cataract also resulted. Two days after the accident, while an effort was being made to remove as much as possible of the lens cortex and to free the iridic adhesion, a fine line, which at first appeared like a thread, was seen in the anterior chamber. With the aid of strong focal illumination, a pair of iris forceps was introduced into the chamber through the corneal wound and the object, which proved to be a cilium, was withdrawn.

It is to be remembered that when eye-lashes are by any means carried into the anterior chamber, the epithelium about the root-sheath may become implanted and give rise to pearl cysts of the iris. Mackenzie was the first to report a case of this kind, while Rothman, in 1872, collected 36 similar cases. In three of these an eye-lash could be readily distinguished within the cyst-wall.

In 1910 Paderstein reported a case in which he attempted to remove a cilium five weeks after a penetrating wound of the eyeball. Four weeks after its removal another cilium was seen, and the attempt to remove it was frustrated by a hemorrhage from the iris. The lens later on became entirely opaque.

A cilium, which had been carried into the anterior chamber twelve years previously, was reported to Barr, in 1909. Two weeks before the case came under observation, the patient received a blow on the head which was immediately followed by a mild irido-cyclitis. Examination showed that there had been absorption of the lens from the previous injury, with partial posterior synechia. There was a small leucoma in the center of the cornea, from the posterior surface of which a cilium extended backwards to the lens capsule.

REPORTS OF SOCIETIES

CHICAGO OPHTHALMOLOGICAL SOCIETY.

DR. RICHARD J. TIVNEN, M. D., PRESIDENT.

NOVEMBER 15, 1915.

Treatment of Obstruction of the Lachrymal Passages, Including Destruction of the Sac with Trichloroacetic Acid.

Dr. Harold Gifford, Omaha, Nebraska, first referred to his previous contribution on this subject, then described a number of points in lachrymal technic. Formerly, in destroying the sac, he generally put the patient to sleep and used the Paquelin cautery to destroy the lining, but he had some fear that if he used the cautery vigorously enough to be sure he destroyed all the sac, he might cause a little necrosis of the bone and have future trouble.

Many years ago the sac was destroyed with chlorid of zinc placed on a piece of cotton and stuffed down into the sac, waiting for Nature to do the rest. Seemingly good results were obtained by that method. However, it was inaccurate and painful, so that he had now adopted the method of destroying the sac with trichloroacetic acid.

DISCUSSION.

Dr. H. W. Woodruff said he had used the method of Dr. Gifford, and thought he was safe in recommending it in cases of acute exacerbations of chronic dacryocystitis in which the surrounding tissues were greatly inflamed and in which it was almost impossible to extirpate the sac. Sometimes one could not tell where the sac began or ended. In such cases he thought the Gifford operation was ideal because it was simple and effective. He was not, however, quite prepared to give up the extirpation of the sac in cases of chronic purulent dacryocystitis in which it was very essential to get rid of the pus sac previous to doing an operation for cataract, and he thought he would still adhere to the method of extirpating the sac.

As to the treatment of dacryocystitis in infants, he agreed with Dr. Gifford except that he had never adopted the external incision in probing the nasal duct by that method. He had had a number of cases that were relieved and cured by simply syringing the sac and duct. Putting the child under the influence of ethyl chlorid and inserting the point of a syringe in the punctum, and with one squirt the fluid in the syringe seems to go with a gush through into the nose and that was the end of the dacryocystitis.

Dr. J. Sheldon Clark, Freeport, Illinois, expressed himself as much interested in seeing Dr. Gifford perform the operation on a tear sac earlier in the day at the clinic held at the Eye and Ear Infirmary. While the technic was simple, yet the operation should be done with care.

It was his opinion that the technic as given would be suitable where one had for his object the destruction of the sac. But in this, as in the Meller excision procedure, one does not have a functioning tear apparatus left.

The Toti operation was mentioned by the essayist and the point made that the opening made from the outside into the nose was prone to close, due to the deposit of fibrin around the bony opening. Dr. Clark was of the opinion that the intranasal route still offers the best way of attacking the floor of the lachrymal fossa in all cases where one desires a functioning tear apparatus following the operation, and that this is the best way of securing drainage. By the intranasal route one can secure a good opening with clean cut margins of mucoperiosteum and when this is done, and the after-treatment persisted in for a time, then a closure does not take place.

Like Dr. Woodruff, in children, and especially in young babies, he had been able to cure cases of blennorrhea with a simple syringing of the lachrymal passages.

Dr. J. A. Pratt, of Aurora, thought that oculists should tend towards preservation in these cases as much as possible, and he thought that was the trend of Dr. Gifford's remarks.

In reference to anesthesia in passing the probe, since he had been doing the West operation he had packed the lateral wall of the nose before passing the probe. This would deaden the bone and relieve the patient of much pain. With the West operation he had had some successes and some failures, and it seemed to him that a great deal depended upon the patients themselves. In cases of phlegmon the intranasal operations gave direct drainage into the nose. Free and good drainage tended possibly towards more rapid healing, so that one could do more conservative operations.

Dr. William A. Mann asked Dr. Gifford whether in these simple cases of obstruction he had ever used the galvanic current. Personally, the speaker found it a great advantage in passing the probe to connect it with a negative pole of the galvanic current, applying from ten to fifteen milliamperes. The probe would pass more easily than it otherwise would.

Dr. Oliver Tydings had tried the various methods, but was heartily in favor of using the probe where there was a tear sac that one could pass it through. He had had some experience along the line mentioned by Dr. Mann. In very many of the cases as long as the stricture was fibrous tissue and not bone, electrolysis would work very well. One had practically the same condition to contend with that he had in a urethral stricture. He had bulb pointed bougies made for this purpose, and he had used them, but unfortunately in many of the cases we had bone to contend with rather than fibrous tissue.

Dr. Oscar Dodd was glad he had seen Dr. Gifford perform the operation he had described, and the only question in his mind was to follow up the cases and know what the results were. Inasmuch as Dr. Gifford had had a large experience in this line of work, he expressed the hope that he (Dr. Gifford) would speak further on the subject.

Dr. Gifford, in closing the discussion, said he had never tried electrolysis in connection with probing. When he first got the idea of using electrolysis he was afraid to try it lest he might get more cicatricial contraction. Electrolysis meant a certain amount of decomposition of tissue, but whether the ultimate result would tend more towards the formation of stricture than one would otherwise have, he did not know.

With regard to the intranasal operation, one could combine the idea he had suggested of shoving through the membrane of the sac into the nose, with the intranasal operation. All one had to do after making the intranasal opening, was to make an external incision through both walls of the sac and shove gauze through into the nose. The scar produced would be imperceptible. He believed some method of covering up the edge of the bone would lead to more permanent results in all operations for making a new hole into the nose.

He had never had the experience related by Dr. Woodruff of curing these cases with a single syringing of the sac.

As to the after treatment of this method of destroying the sac, it did not amount to anything. All one had to do was to pack the cavity with some aristol, merely to keep the cavity from filling up with tears, and keep a little zinc oxid ointment on the opening in the skin. The granulating cavity left by the trichloroacetic, unless it were filled with powder or the sides kept pressed together, might tend to fill with pus. In

one case of mucocele he had that thing happen. The mucocele was as large as a pigeon's egg. The woman returned two weeks after the acid had been used, with the pocket dilated with pus. He let out the pus, and pushed the walls together with a wad of cotton on the outside, kept a bandage on and the thing closed up.

Some Observations on the Operation of Iridotasis for Glaucoma. (Reported in full in the March, 1916, *Ophthalmic Record*.)

DISCUSSION.

Dr. Casey A. Wood said all were interested in the Borthen operation as it touched a probable cure for chronic simple glaucoma. Almost any operation would cure a case of glaucoma in which acute attacks occur, but in cases of slowly progressive, simple glaucoma we have a much more difficult problem to deal with, and it seemed to him that the operation described by the essayist was the simplest and perhaps the most satisfactory method of dealing with this formidable disease.

He had one practical suggestion to make in connection with the operation itself, based on his own experience.

Owing to the screen of conjunctival flap it is not easy to pass an iridectomy forceps into the anterior chamber through the small opening called for by Borthen and required for success in this operation. Fortunately this part of the procedure is not necessary if one, in withdrawing the keratome, press upon the posterior lip of the wound. A gush of aqueous follows pressure against the posterior surface adjoining the scleral wound and with the flow of fluid the iris margin and the intermediate iridic zone are carried out through the opening. After this has been done one finds the iris in the position desired. In carrying out Borthen's ideas it is now necessary to grasp the iris and pull it up still further (which constitutes the required "stretching" of the iris) and well outside the incision.

Dr. N. Remmen called attention to Borthen's article which appeared about four years ago in which he (Borthen) described his first operation, which was an accident. He was going to do an iridectomy for glaucoma in a child. He made an opening with the Graefe knife, and suddenly there was considerable expulsion of the iris and vitreous, and he thought the whole eye was lost. He bandaged the eye and sent the patient home. The patient was not seen again for about two months, at the

end of which time the patient returned and to the great surprise of Borthen the eye was almost perfect.

Dr. Remmen said the reason why oculists did not pay much attention to the operation at the time was that Holth had performed iridencleisis and it was thought to be about the same thing. In connection with the operation as described by Dr. Roy there were points of undoubted value. In the first place, pulling or stretching the iris opened up the spaces of Fontana. There was also possibly some filtration. The stretching of the iris may keep the spaces of Fontana open permanently in the nighttime as well as in daytime. Tension was higher at night, and there was no other operation that would do this as well as this one would. It might infrequently happen that no hypertension in a glaucoma patient could be found in the daytime because of daylight contracting the pupil, but if the patient was put in a dark room for two or three hours and the pupil allowed to dilate, we would be able to find increased tension.

As to the use of the tonometer he thought it was of great importance. For example, he had a patient about a year ago who was blind in one eye. He looked at him hurriedly and thought it was a case of atrophy. The patient had been treated by an able physician for atrophy and no operation was done. The sight began to fail in the other eye. The speaker glanced into that eye and saw slight paleness of the disk. Vision was still nearly normal, and he began to think of the cause of the atrophy. Meanwhile, he thought he would take the tension and to his surprise found it was nearly fifty. With palpation it seemed practically normal. Myotics did not reduce the tension. He did trephining and got a very good result. He thought trephining would still be considered a good operation. He recalled four cases of glaucoma in which everything else had been tried but trephining, and this operation gave a very happy result.

Dr. Wesley Hamilton Peck expressed himself as being greatly impressed with the good features of iridotaxis because he had been following the results of the Elliot operation and had found a number of cases of late infection, but there was a striking absence of infection in Borthen's cases.

In one of the operations performed by Dr. Roy at the infirmary the iris retracted into the anterior chamber, and it was claimed by Borthen that by using atropin this could

almost certainly be avoided. Dr. Roy had to draw the iris out again. Dr. Peck could not see any objection to using atropin, and judging from Borthen's results it would be better to use it. Another good feature was the continued reduction of tension. According to Borthen, palpation with the fingers was practically valueless; that he had practically discarded it and now used the tonometer. Borthen did Holth's operation for a number of years. Cases of injury in which there was incarceration of the iris he noticed were followed by permanent reduction of the tension, and this led him to try stretching of the iris and Dr. Peck believed this operation was going to become popular from almost every point of view. Very few operations had been recorded in the literature in which the results had been so uniformly successful.

He was impressed with the absence of infection in the cases reported by Dr. Casey Wood in his modification of the Zorab operation and tends to confirm the greater safety of iridodetachment over trephining. Several of his professional friends had told him that they had practically given up trephining on account of the many cases of late infection. In cases in which there was atrophy of the iris it was practically impossible to do iridodetachment.

Another point of importance was to make a very small incision, otherwise the iris was almost certain to retract into the anterior chamber.

Dr. Harold Gifford, Omaha, Nebraska, asked Dr. Roy whether there was a bleb after iridodetachment the same as after trephining.

Dr. Roy replied there was a fairly good bleb.

Dr. Gifford, referring to the cause of detachment of the choroid after trephining, said it was much more frequent than after any operation unless it be the Lagrange. One did not appreciate how often this occurred unless he followed Elliot's advice and used atropin regularly after the operation. In his early cases he was afraid to use atropin after trephining. After he began to use atropin systematically and looked especially for detachment of the choroid he found he had a number of such cases. In one case he had a double detachment of the choroid; one sticking out into the pupil from each side. Detachment of the choroid was an unpleasant looking thing, and although ultimate recovery was said to be invariable, he did not think the man's sight was as good as it would have been

if he had not had it. Some attributed the frequency of these detachments after trephining to the sudden loss of fluid; others to a traumatic connection between the anterior chamber and the perichoroidal space. Both theories were wrong; otherwise it would be more common after cataract operations. The true explanation is to be found in the long continued low tension after the trephining. The occurrence of the bleb after iridodastasis showed that the reduction of pressure was due, not to stretching the iris nor to freeing Fontana's spaces (which it evidently cannot do), but to the formation of a fistula.

Dr. H. W. Woodruff spoke of a man who came to the Infirmary last April with the history of having had an iridectomy performed on his right eye about eight years ago. This was without result as there was an entire loss of vision so that he had no perception of light. When he came he had practically no vision in the remaining eye. The patient could see the movement of the hand in the lower outer field but could not count fingers at all. Operation was suggested. The man objected to it, stating that he had had such an unfavorable experience with the other eye that he did not want to have any other operation. Eserin was used and much to the astonishment of Dr. Woodruff vision gradually improved until a month ago the patient had 20/80 vision in that eye. The man was able to get about, and Dr. Woodruff said he was certainly thankful he did not operate upon that eye.

Dr. Frank Allport contended that glaucoma in a large proportion of cases was an expression of a general condition, and he always insisted upon an absolutely thorough general examination of the patient. He believed a great many cases of glaucoma can be relieved by a proper diagnosis of a general condition and the relief of such conditions by appropriate treatment, together with the use of miotics. He hardly believed that Dr. Roy would advocate invariably the performance of any kind of operation upon the eye immediately he made up his mind that a glaucomatous condition existed.

With regard to the operation described by Dr. Roy, he had not performed it himself but he intended to do so when an opportunity presented. Ophthalmologists were very much in the dark as to what they wanted to do in glaucoma. The present operations were not by any means satisfactory, and ophthalmic surgeons had passed from iridectomy to various other procedures, such as the Lagrange operation, the Elliot

operation, etc. . . . The Elliot operation swept over the world like a cyclone a short time ago and everybody was doing it. The returns were now coming in from the Elliot operation. Late infections were reported, and a great many were abandoning the operation. If one could get results from such a simple operation as the one that has been described, why not perform it? The Borthen operation appealed to him exceedingly, and he was going to give it a thorough trial.

Dr. Francis Lane thought the success of the operation was due to the fact that the iris being spongy tissue it afforded ample opportunity for a cystoid cicatrix to form, and thereby take care of drainage beneath the conjunctiva.

Dr. George F. Fiske had never seen a case of glaucoma treated by miotics alone that recovered. He had seen patients on whom two or three or four iridectomies had been performed keep vision of from 20/20 to 20/30 for from twenty-five to thirty-three years. Personally, if he had glaucoma he would be operated on at once; would have his general health attended to, and miotics used the rest of his life.

Dr. Roy, in closing, said he had been misunderstood with reference to the use of miotics. When he found miotics were doing no good and the symptoms were getting worse it was a question of operation, and he used miotics as an adjuvant after operation. He had not used atropin after operation. He had never had an iris slip back into the anterior chamber in any case he had operated on.

Skin Grafting; the Use of Vaseline in Cutting and the Open Air Treatment. (Reported in Full in the March, 1916, *Ophthalmic Record*.)
DISCUSSION.

Dr. Oscar Dodd had used vaseline on the knife to start the incision so that it would not stick to the skin. He had always cut the grafts dry and applied them dry, but Dr. Parker's method of applying vaseline on the knife allowed it to slide through and make the incision better than he had been able to do.

Dr. Harold Gifford had never tried the use of vaseline, but was going to do so after what Dr. Parker had said. An open dressing was good but not essential. If one put vaseline and aristol on wet cotton and after covering the latter with gutta-percha to prevent drying, put on a firm dressing, the graft would never peel off. He had always been able to stop

the bleeding by pressing the flap firmly down on the raw surface.

Extraction of Cataract Leaving an Undetached Conjunctival Flap or Bridge on the Temporal Side; Its Advantages.

Dr. Frank C. Todd, Minneapolis, Minn., said his experience was limited to seventy-one operations in which this incision was used. The advantages over the use of a suture are obvious. The greatest advantage may be summed up in the word safety. It often happens after or during a cataract extraction and before the eye is closed that the lid winking over the eyeball catches on the lower lip of the wound, thus turning it over and outwards, sometimes permitting of the escape of vitreous, or at least interfering with the proper coaptation of the two edges of the wound, thereby endangering the eye from infection of the wound, when the edge of the lid, so difficult to sterilize, rubs against the inner surface. This cannot take place when the conjunctival flap exists, for the lid rides safely over the attached conjunctival flap and the cornea. There is less danger of escape of vitreous, and he has had a number of cases in which no vitreous was lost or where a little vitreous presented, in which he is confident a serious loss of vitreous would have occurred were it not for the presence of the conjunctival flap, and it proves a safeguard of especial value in unruly patients.

As to visual results, the number of cases is not sufficient to draw any definite conclusions, but both in the University Hospital cases and in private practice he found that the average of visual results was better in the cases where the flap was undetached than was the case where the conjunctiva was detached. His experience leads him to believe that an undetached conjunctival flap is a procedure of preference in cataract extraction.

DISCUSSION.

Dr. William A. Fisher thought that if the members of the society would take a vote, it would be to the effect that loss of vitreous was one of the most serious complications one could have during an operation and if the flap described by Dr. Todd would keep the vitreous back he had contributed a very valuable addition to the cataract technic. Loss of vitreous after the lens was born was of little consequence in any method of extraction if the lids were kept away from the eyeball, but loss of vitreous preceding the delivery of the lens was a serious

matter to most operators. He thought that methods of removing the lens when vitreous had preceded it should be emphasized and much attention should be given to the pressure that might be given to the eyeball through the lids.

He was pleased to note that Dr. Todd did not remove the dressings for four days. If all has gone well after a cataract operation for four days it is safe to say that there would not be any objection to waiting four or five days more and allow the wound to heal more strongly. Dr. Todd is to be congratulated upon his uniformly good results, but he believed Todd could extract many of his lenses in capsule, providing he would try the pressure before rupturing the capsule. If there was prolapse of the iris he did not think it should be cut off until fourteen days after the operation on account of the danger of opening the corneal wound and inviting infection. When the prolapse is cut off fixation forceps should not be used, because a sudden movement of the eye caused by the pain might open up the corneal wound and invite infection. If the eye is not dressed for nine days infection will be rare.

PAUL GUILFORD,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

W. C. BANE, M. D., *Presiding.*

NOVEMBER 20, 1915.

Injury from Shot.

Dr. W. H. Crisp presented D. P., aged 17 years who, on September 28, was fired at with a shot gun from half a block away. One shot penetrated and probably passed completely through left eye to inner side of orbit. Scar in sclera up and out. Note tension and fundus which shows partial absorption of hemorrhage, and probably general detachment of inner coats. Vision faint P. L.

DISCUSSION.

Dr. D. H. Coover said that he could not see what was to be gained by waiting: that the eye was soft and would be safer for the patient if removed.

Dr. F. R. Spencer believed that the eye should be removed and that the sooner the better.

Dr. J. A. McCaw said that he had seen a similar case two years ago and but recently saw the case and that the eye was gone.

Dr. Edward Jackson called attention to the fact that shot wounds do not usually cause sympathetic ophthalmia, but thought in this case it might be well to take the eye out.

Dr. G. F. Libby was of the opinion that if the condition of the eye prevented work that it should be removed, otherwise, might wait.

Tuberculosis of Retinal Vessels.

Dr. Edward Jackson again presented Mrs. L., who was first before the society February 20, 1915. Now shows appearance of retinitis proliferans. V. R. 0.03, V. L. 0.3.

Left has improved from 0.2 to 0.3 in last two months. No fresh hemorrhages in either eye since May. Note with ophthalmoscope right eye, scar tissue above dragging retinal vessels forward to plus 12 D. Left, scars in vitreous.

DISCUSSION.

Dr. Bane said that the society was much indebted to Dr. Jackson for again showing the patient. He remembered the case and recalled that he thought at the time it was first seen that it might be albuminuric retinitis.

Dr. Spencer wished to know if there were other tubercular lesions, to which Dr. Jackson replied in the negative.

Interstitial Keratitis.

Dr. C. E. Walker presented O. K., age 11, who three months before had been struck in the left eye by a sun flower. Noticed a spot on eye but no further trouble. When a child was very sick with cholera infantum. Lost teeth early. Present condition: Enlarged tonsils, Interstitial keratitis, Blood vessels of iris enlarged, Exudate in anterior chamber, Posterior synechia, Cyclitis, T—, Enlarged follicles.

Treatment: Atropine, dionin and hot applications. Yellow ointment. Internally, calomel and syr. iodide of iron. Tuberculin had been used.

DISCUSSION.

Dr. Walker replying to Dr. Spencer said that the boy had had rheumatism, but had recovered from it. Dr. Spencer continuing, the case looked like one of sclerosing keratitis and in no way connected with the injury.

Dr. Libby: The accident having been so trivial, if present condition were due to it, it would suggest disturbed metabolism.

Hemorrhagic Choroiditis.

Dr. Walker also presented Miss R. J., age 23: had been

wearing R. E.—.75 ax. 180°, L. E.—.50 ax. 180° and who for the past six weeks had been having headaches and failing vision. Examination revealed chalazion right upper eyelid, hemorrhagic choroiditis. Corneal astigmatia R. E. 2 and L. E. 1 with rule. October 2, 1915, R. E. V. 20/50 W.—2. ax. 180°: L. E. V. 20/200 W.—1. ax. 180°. November 20, under homatropine, R. E. V. fingers at 6 in. W. plus .50 = — 2. ax. 180°: L. E. V. 20/50 W. plus 1. ax. 90°. Advised neurological and X-ray, also nose examination. Urine negative. Treatment: Ung. hydrarg., pot. iodide and mild chloride. In the eye were used solution and ointment of boric acid and dionin.

DISCUSSION.

Dr. Walker replying to question of Dr. Bane as to the presence of hyalitis, said that there was.

Angioma.

Dr. H. R. Stilwill presented baby F., 4 months old. First seen October 18. Normal labor. Weight at birth, 6½ lbs. Always healthy. No birth marks on the body. Eight weeks ago mother first noticed swelling over the left tear sac, since which time it has been increasing in size. The swelling is of bluish tint and involves the connective tissue of the inner halves of the upper and lower lids and the region of the lachrymal sac. Swelling is temporarily increased when the baby cries or the head is placed in a dependent position. The tumor is soft and does not pulsate. The puncti are open and there is no epiphora. No involvement of the eye ball.

DISCUSSION.

Dr. Crisp was suspicious that it was not angioma. Remarked that injection of boiling water had been suggested for such condition.

Dr. Jackson. Looks as though it is largely venous. If it has not increased in size would wait. If it has increased in size would ligate or use carbon dioxide snow.

Dr. Walker had had a case very similar to this one, in which he cut down and dissected it out with fine results. Does not favor injection methods.

Dr. Spencer has used electric needle from which he obtained temporary but no permanent improvement.

Bilateral Dacryocystitis, Prince and West Operations.

Dr. W. C. Bane presented this patient. Mrs. M. M., age, 54. August 11, 1915, left side was operated for dacryocystitis, following closely the method of Dr. A. E. Prince. Opening into

the nose was kept open until healed by passing No. 14 Theobald probe every few days. Recovery was uncomplicated and result excellent.

Two weeks later the West operation was done at the clinic, upon the right side by Dr. Baum. Uncomplicated recovery, but at times there is some overflow of tears.

Dacryocystitis: Obliteration of Sac (Gifford's Method).

Dr. Melville Black presented this patient who had suffered long from dacryocystitis and had been probed and syringed by different men for long periods of time without benefit. Two weeks before, under local anesthesia and at one sitting the lachrymal sac had been obliterated by the application of trichloracetic acid to its interior. The operation was but slightly painful; no sutures were used and union took place by first intention. No moisture can be obtained by pressure over the region of the sac and the patient claims that there has been no trouble from epiphora since the operation.

Dr. Boyd was of the opinion that as the simplicity of the operation, the readiness with which it can be done under local anesthesia, the little after treatment required, the insignificant scarring and the satisfactory results following the Gifford method of obliterating the sac becomes better known, that in all cases of chronic dacryocystitis it will become the routine procedure.

Herpes Zoster Ophthalmicus.

Dr. W. C. Bane presented Mr. J. H., aged 72, who was first seen November 17, at which time he gave history of having had La Grippe three weeks before, accompanied by an eruption on the left side of the forehead, extending into the hair and upon the cheek. Pain upon left side of head and in left eye with impaired vision of that eye.

Examination: Vision of left eye, fingers at one foot. Superficial ulcer of the cornea 2 x 3 mm. A vertical stained opacity of the central portion of the cornea. Some circumcorneal injection. Iris partly adherent.

The eye has been kept closed and has shown improvement under the use of atropine and subconjunctival injections of 2 percent cinnamate of soda.

Pemphigus of the Conjunctiva.

Dr. Bane again presented patient whom he had shown to the society at its meeting of April 17. This patient had been clinically cured by Dr. Bane, of pemphigus of the conjunctiva

of the left eye, but it has at this time (Apr. 17) appeared in the right eye and was being treated along the line that had before proved efficient, namely, use of X-rays, and was last shown because of active ulceration of the cornea. Since the last exhibition of the case, Dr. Bane states that the ulcer yielded kindly to treatment and the patient was greatly improved.

Vestiges of Hyaloid Vessels.

Dr. Melville Black had a boy present showing remains of hyaloid vessels, extending from the lens of right eye, but not reaching the fundus. Appearance of the fundus resembled that of an albino.

Congenital, Diffuse, Lens Opacities; not Opaque to the Ophthalmoscope.

Dr. E. T. Boyd presented a little girl showing the above condition, both lenses being involved, peculiar and interesting in that they were extensive, marked and distinct by oblique illumination but offered no hindrance to direct ophthalmoscopic examination. The patient with refractive correction possessed vision of 20/20 in each eye.

Dr. Jackson said that he had never seen a case like it, but that he did not believe that the "opacities" were opaque, but thought the appearance probably due to difference of refraction in different portions of the lens.

Blepharochalasis.

Dr. Boyd presented a girl of 19 with ptosis of right eye of four years' duration. At the age of 15, time of first menstruation, had attack of angioneurotic edema of right upper eyelid. At second menstrual period the edema again appeared. Subsequent attacks of edema of the right upper eyelid have occurred, but the ptosis dates from its earlier appearance, coincident with the onset of menstrual life and it is this clinical history that points to the above diagnosis.

In discussing the case Dr. Jackson believed it to be a form of blepharochalasis and concurred with Dr. Boyd in that some form of advancement of the levator would be the proper operative procedure.

Case Reports.

Dr. C. E. Walker reported a case in which a piece of steel had been embedded in the sclera above the optic nerve for a period of twelve years with the eye still good.

Dr. F. R. Spencer reported the following case:

Mr. W. O. McK. first consulted me October 26, 1915. He

is 33 years old, widower, and gave the following history: While working in a mine at Lakewood, Colorado, he struck a "missed hole" of giant powder the afternoon of the 26th. I saw him a few hours after the injury and found the following: The right eye had a very few fine particles of mud and sand imbedded in the lids, cornea and ocular conjunctiva, but all were superficial and easily removed. The left had been penetrated by two fine pieces of rock. One entered the sclera a few mm. from the limbus in the inferior nasal quadrant and the other entered the cornea just external to the pupillary area splitting the iris from above one mm. external to the pupillary border to the ciliary border.

All of the foreign bodies on the surface of each eye ball were removed and both pupils were dilated with atropine. It has been impossible to find either piece of rock in the left vitreous, although the two pieces probably lie in the anterior portion of the vitreous.

The lens has not shown any evidence of injury, but the vitreous now has some floating opacities as evidence of the irritation from the foreign bodies. The tension of the left eye was slightly diminished at first, but has been normal since. The tension of the right eye has been normal from the first.

The question of trying to save the left eye now presents itself, although the danger of sympathetic inflammation compels one to give the right eye the first consideration.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

DR. WM. ZENTMAYER, *Chairman*.

NOVEMBER 11, 1915.

Symposium on "Muscle Imbalance and Its Treatment." Anomalies of Refraction.

Dr. Zentmayer said that about 90 percent of ametropes show a deviation of the visual axis when fusion is broken up either by making the image of the object fixed different for the two eyes or by displacing the image in the one eye. How are we to view these slight deviations? Landolt believes they are in no sense pathologic and are not even to be considered as tendencies to deviation but simply show the position the eye would take if binocular vision were destroyed. Others look upon them as due to a disturbance between accommodation and con-

vergence produced by the ametropia while still others believe that certain types represent a stage in evolution, that is, that exophorias are sometimes an expression of atavism. Hyperphoria is probably always anatomic; Dr. Reber has endorsed this view. Using the terms representing the nature of the deviation rather than the conditions underlying them such as convergence insufficiency, etc., it may be said that esophoria in the distance in H. is due to the convergence associated with the accommodative effect required to correct the hyperopia. The same muscle status in myopia is more difficult to explain. Dr. Wallace has suggested that it is due to the excessive convergence used by myopes at near work not relaxing in distant vision. This may explain the moderate degrees, but it seems inapplicable to the very large number of low degrees of myopia met with. In all classes there are a few due to anatomic causes. Hyperphoria is of less frequent occurrence than lateral tendencies, occurring in about 50 percent of ametropia. As in the great majority of cases it is of very low degree it does not frequently call for correction. Less than 2 degrees usually produce no symptoms. The effect of the correction of the ametropia upon the heterophorias of very low degree is not marked. Esophoria associated with H. is usually reduced in amount. Exophoria for near association with M. will be reduced by the correction of the myopic refraction. The principles to be borne in mind in ordering glasses for the ametropes in the presence of a heterophoria are that in convergence excess the total H. is to be corrected, in convergence insufficiency only as much of the H. as is demanded by the age of the patient and his occupation. In myopia with convergence insufficiency the M. is to be fully corrected. In M. with convergence excess an undercorrection is indicated.

Prism and Operative Treatment.

Dr. Posey spoke of the incorporation of prisms with the lenses correcting ametropia as one of the most valuable means of overcoming muscular asthenopia. The chief value of prisms when used in this way, he thought was in hyperphoria, though he could give no fixed rule to follow for their employment in these classes of cases. Vertical insufficiencies of 1 degree or less very rarely require correction, and indeed the correction of the ametropia usually relieves the symptoms attending hyperphoria of even 2 degrees; yet he had prescribed vertical prisms in some cases of hyperphoria of less than 2 degrees, where such

symptoms as unilateral headache, unilateral twitching of the eye lids and dizziness had persisted after careful sphero-cylindrical corrections. Defects of over 5 degrees usually call for a tenotomy of an elevator. In no case is it desirable to prescribe a prism which corrects all of the hyperphoria.

In exophoria of moderate degree, prisms with bases in, correcting a third or a fourth of the muscle error, are very useful in combination with the ametropic correction for near work. When strengthening of adduction by operation, preferably by a deWecker capsule advancement of both interni, is refused by the patient, prisms with bases in are often of value for constant use, but in no case should a prism higher than 5 degrees in each eye be prescribed, on account of certain optical disadvantages as well as the weight of the lenses.

In esophoria prisms with bases out have a limited usefulness. Dr. Posey prescribes them chiefly in cases of hypermetropia with esophoria of about 10 degrees, when troublesome distance asthenopia is present, and when the full correction of the hypermetropia cannot be prescribed on account of residual spasm of accommodation.

Dr. Posey asserted that in his opinion nearly all muscle-errors, apart from those associated with considerable degrees of ametropia, are dependent upon faulty anatomical conditions. He has found prism exercises of value only so long as they were maintained, and he has never seen any permanent change in the muscle error result from them. While the constant use of prisms does perhaps in some cases unmask latent muscle errors earlier than is the case if prisms are not prescribed, this precipitous unmasking is not harmful, and occurs in such a slight degree that in most instances it is unnecessary to increase the strength of prisms to alleviate a recrudescence of muscular asthenopic symptoms. Dr. Posey decried graduated tenotomies, so-called, and believed no operative measures justifiable unless there is an appreciably high muscle error. When the external rectus is divided for the relief of exophoria, prism exercise to bring up adduction should be actively practiced for weeks afterward. In such cases systematic rhythmical exercises, with increasingly stronger prisms, were of decided value. He had never seen permanent benefit derived from exercise of the abductors or of the elevators or depressors.

D. W. W. WATSON,
Secretary.

Canton, Ohio, January 6, 1916.

To the Editor of THE OPHTHALMIC RECORD:

Dear Sir: About every so often the problem of the inverted image upon the retina and its mystery comes forward with attempts to explain the phenomenon of seeing objects erect, while the retinal image is inverted. No knowledge is yet in our possession to explain it. Possibly there never will be. How the image is formed upon the retina the laws of light and optics make perfectly plain; upon this subject we have abundant and exact knowledge.

That the impression of the image upon the retina is transmitted to the brain, is also common knowledge.

It is here, however that our knowledge stops—absolutely a dead stop.

How impressions through any of our senses, after being conveyed to the brain, are converted into thought and intelligence transcends all human knowledge.

This being true, all human attempts to explain it show that the one attempting the explanation fails to recognize this important limitation, namely: that there is no knowledge in our possession that can explain it.

Very truly,

Edward P. Morrow.

In Kentucky they not only pass health laws but they enforce them. Recently in Lexington, Ky., two midwives were fined and publicly reprimanded by the judge for failure to report two cases of ophthalmia neonatorum. This is an echo of the persevering work of Dr. J. A. Stucky and his able associate, Miss Neville.

Maine has passed a law to give every deserving blind person a pension for life of \$200 a year on the certificate of "a physician to be appointed by the city clerk, or selectmen for a fee of \$2 for each certificate handed in." There is also another law in Maine to the effect that under the workmen's compensation law, "wages shall be paid for 100 weeks for total loss of the sight of an eye."

Charles Heady Beard died January 3rd at his home, 1019 East 48th street, Chicago, after an illness of a year and a half. In his death the profession loses one of its most scholarly and talented members. He was born in Louisville, Kentucky, January 27th, 1855.

He graduated from the University of Louisville in 1877, and for six years was in general practice in Cammerton, Indiana. In 1883 he gave up the general practice of medicine and began the study of ophthalmology by taking an internship in the Manhattan Eye and Ear Hospital, New York, where he studied under the elder Knapp and Agnew. This work was supplemented by study in England and on the continent during the following and in subsequent years.

He began the practice of ophthalmology in Chicago in 1886. For many years he was one of the head surgeons of the Illinois Charitable Eye and Ear Infirmary and Oculist to the Passavant Memorial Hospital. He was ex-president of the Chicago Ophthalmological Society, a member of the American Ophthalmological Society, The American Academy of Ophthalmology and Otolaryngology, and the American College of Surgery. His "Ophthalmic Surgery," first published in 1910, was immediately accepted as one of authoritative works on the surgery of the eye. In 1914 he contributed to the American System of Ophthalmic Operations, the volume on Semiology and Diagnosis.

As an operator his work was characterized by resourcefulness and originality and a deftness characteristic of the French school of surgeons of whom he was a student and admirer.

As an author his style was clear and convincing with a quaint individuality which robbed it of the literary barrenness common to most scientific work. As an artist of no mean ability he was enabled to illustrate his work with a power of delineation which often served to convey his thought more clearly than could be done by words. This same talent led him to make many exquisite drawings of the fundus oculi for which he was awarded a special diploma by the American Medical Association in 1908.

Scholar, scientist, artist, and author, a man of rare personal charm, he leaves to mourn his loss a host of friends in and out of profession.



CHARLES HEADY BEARD.
1855—1916

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Fifty cases of trachoma are reported in the Indianapolis schools.

Dr. Santos Fernandos of Havana, Cuba, addressed the Wills Hospital Society, Philadelphia, on January 4.

Mr. T. Herbert Bell has been appointed lecturer in clinical ophthalmology in the Manitoba Medical College.

Dr. Meyer Wiener of St. Louis was married on December 28th to Miss Marguerite Edith Lesser of Albany, N. Y.

In Vienna Prof. von Reuss has celebrated the 50th jubilee of his doctorate, and Prof. Klein-Buringer his 70th birthday.

According to Dr. Helen Nolen of the American Hospital at Nice more than 40,000 soldiers of the Allies have been blinded since the war began.

Dr. F. H. Verhoeff of Boston is to deliver one of a series of public health lectures under the auspices of the Harvard Medical School on February 13.

Lieutenant-Colonel John D. Courtney of Ottawa, Canada, is in command of the Canadian Eye and Ear Hospital at Folkestone, England.

Dr. W. Herbert Adams has returned from postgraduate study at the Royal London Ophthalmic Hospital and Oxford University, and is now located in Jacksonville, Florida.

The foreign literature records the deaths of Professor Adolph Weber of Vienna at the age of 86, and Professor B. Wickerkiewicz of Cracow at the age of 58.

Dr. Thomas A. Woodruff has returned to Chicago after a vacation spent at his summer place in New London, Conn.

Owing to the exigencies of war the French Marine Service has lowered the visual requirements of all but the first grade, including pilots, gunners, etc.

The trachoma fight continues in the Appalachian mountains. Surgeon John McMullen, U. S. P. H. S., has recently visited the mountain clinics of Kentucky, and will establish a clinic in Bell County. A trachoma hospital of 20 beds has been opened at Welch, W. Va.

The twenty-first annual meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held in Memphis, Tenn., December 5, 6, 7, 1916.

The mid-winter convention of the Illuminating Engineering Society will be held in New York City on February 10 and 11. An honorary membership will be conferred upon Thomas A. Edison. Dr. F. Park Lewis of Buffalo will be one of the speakers.

The following neat verses appear in the *Prescriber* (Edinburgh) for October:

Twinkle, twinkle, little sty,
Shining on my patient's eye!
For your treatment I have come,
Troublesome hordeolum!

Shall I first your form engulf
With a wash of zinc sulph.?
Or, as once I did before,
Lave you with some acid. bor.

No—my plan will be to treat
With a little gentle heat;
Till your form's developed, then
Cut—and (do not) come again!

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A. M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suiker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.) A. G. Wippen (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Poli.) Richard S. Pattillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wippen (E.E.N.T.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. N. T.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippen (E.E.N.T.)
10 A. M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P. M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. W. Eiss (Inf.) F. R. Gressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) I. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. W. Eiss (Inf.) F. R. Gressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Clifford (St. Luke's) *Cassy Wood (St. Luke's) T. A. Woodruff (St. Luke's) I. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. W. Eiss (Inf.) F. R. Gressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) I. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) Oliver Tydings (E. N. T.)
3 P. M.	*Wm. E. Gamble (U of I.) Wm. H. Wilder (Rush) H. S. Gradle (Daily) 3.5 (E. M. D.)	R. J. Tivnen (M. H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M. H.)	W. Allen Barr (C.C.S.)	Geo. F. Suiker (P. G.) 2.5 H. Cuthbertson A. Duncan
4 P. M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2.5	C. W. Hawley (P.-G.) 2.5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	I. B. Loring (U of I.) E. K. Findlay (U of I.) G. F. Suiker (P.-G.) 2.5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2.5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

County: Cook County Hospital, W.
Harrison and Honor Streets.
Inf.: Illinois Charitable Eye and Ear
Infirmary, Peoria and Adams Streets.
M. H.: Mercy Hospital.

Rush: Rush Medical College, W.
Harrison and Wood Streets.
St. Luke's: St. Luke's Hospital, 1416
Indiana Avenue.
U. of I.: College of Medicine, Uni-
versity of Illinois, Congress and Lin-
coln Streets.
241 Dearborn Street.

C. C. S.: Chicago Clinical School,
1844 W. Harrison Street.
E. M. D.: Emanuel Mandel Dis-
pensary, 1012 Maxwell St

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CARDS FOR SIGHT TESTING IN SCHOOLS.

BY

EDWARD JACKSON, M. D.

DENVER, COLO.

The recent work of the Committee of the Section on Ophthalmology of the American Medical Association, in the direction of standardizing test cards (see Transaction of this section for 1915) has brought out strongly what has been understood by many who have sought to improve our test cards; that *the letters of the alphabet furnish a very poor test for measuring acuteness of vision.*

The different letters of the alphabet even when reduced to the "block letter" form, and a size to subtend a five-minute angle, vary in visibility more than one-third. Measuring visual acuity with them might be compared to measuring distances with a collection of "yard sticks" that varied in length from 30 to 40 inches. So long as one made all his measurements with just the same particular set of "yard sticks" he might get results that could be compared with one another. But they would be worth little for comparison with measurements made with a different group of "yard sticks."

Modern science rests upon the foundation of exact measurements. To persist in measuring visual acuity by a variable standard, is to excite the amusement if not the contempt of scientific workers in all other lines. Of course there are limits to the accuracy of measurements of any kind; the "personal equation," the necessary "limits of exactness," may be reached in any kind of scientific measurement. But this does not lessen or condone the fault or folly of persisting in measuring with scales or balances that are known to be grossly inaccurate. With tests at our command that are far more accurate, and in other ways entirely superior for the purpose, the use of test letters to measure acuteness of vision should be given up.

The theory that a letter or figure of a certain shape can be seen twice as far if made twice as large (linear dimensions) is quite correct for practical purposes. But if applied to letters and figures of different shapes, it is quite untrue and mislead-

ing. The letter A, if of the same shape can be seen twice as far if made twice as high and twice as broad. But if the letter B is made twice as high and twice as broad as the A, it cannot be seen twice as far. On some test cards it can be recognized but little farther than the smaller A. A miscellaneous series of letters or figures with their sizes proportioned to the different distances at which they are supposed to be visible, furnishes a very poor means of measuring visual acuity; although it does furnish a valuable means for the subjective testing of refraction. The cards of test letters in common use for sight testing in the schools have been prepared upon this inferior inappropriate plan; they are modifications of the test cards in use by oculists to measure ametropia with the test lenses. For sight testing in the schools we need cards worked out on a different basis, and for this particular purpose.



Fig. 1—Visual tests. A, The Snellen test for illiterates; B, The International broken ring; C, The incomplete square; D, Wolffberg's "Cross-point figure."

Test Objects.

There are a number of appropriate figures from which to choose the one to be used in testing the sight of school children. Snellen worked out a very excellent one as a test for illiterates, sometimes known as the "E" test. The person tested is required to recognize the direction in which the arms of the figure are turned. Landolt suggested the broken ring, the test being to recognize the direction in which the break in the ring is placed. The above tests are commonly made of such sizes as to subtend an angle of five minutes, at the distance they are supposed to be seen by an eye with standard vision. But the direction of the arms of the Snellen figure can be recognized at a greater distance or under a smaller angle, four to four and one-half minutes. The writer proposed an incomplete square, the test being to see which side of the square is incomplete. This should be recognized when subtending an angle of three minutes. Wolffberg suggested four black squares symmetrically arranged around a white square, with a white circle in one of the black squares. The person tested is to indicate which of the black squares contains the white circle. These different tests are shown in Fig. 1.

Among these different test figures the broken ring of Landolt has certain advantages: (1) When made to subtend an angle of five minutes, corresponding to that of test letters, the width of the black being one minute, and the break in the black one minute, it is a good test of standard vision. (2) The break in the ring can be placed in either of eight directions, up, down, right, left, or half way between these positions, while the other figures can only be placed in one of four positions. (3) The broken ring has been adopted and recommended as the international standard of visual acuity, by the International Ophthalmological Congress held in Naples in 1909. Hence the records obtained with this test are more likely to be exactly comparable with similar records obtained in other countries. (4) The broken ring placed at the center of a square or circular card constitutes an "unlearnable" test. It can be concealed an instant and turned in either direction; and the person tested



Fig. 2.—International visual test arranged for testing vision at five meters.

cannot rightly guess in which direction it is turned, more than once in four or eight times. A symmetrical group of such broken rings, as shown in Figure 2, can be placed at the center of a symmetrical card (square, circle, octagon, etc.,) and constitutes a test entirely unlearnable and very convenient to use. Some such test should replace cards of test letters for all testing of visual acuity of school children, railroad men, sailors, etc.

Superiority of International Test of Visual Acuity.

It furnishes a fixed or constant standard. This is impossible with test letters. The nearest approach that Snellen could make with letters was to insist if all the letters on the given line were seen at the required distance the vision would be as indicated by the numbering. That is to say, the Snellen test depends on the perception of the hardest letter on the line. The test is often a single letter on each line. This letter is always in one position, and therefore inferior to the broken ring. The

hardest letter to see on one line differs in visibility from the hardest letter on another line. The results obtained with two different "hardest letters" cannot be properly compared. The broken ring gives a much better approximation to the limits of scientific accuracy in sight testing than can the letters. Moreover, the broken ring is as fair an equivalent for the Snellen letters at their best as we now have; and furnishes a good practical standard. While many eyes can pick out the break when the ring is at such a distance that it subtends an angle of less than five minutes, and so are credited with better than full standard vision; this is necessarily true of a standard test that is in practical use for normal eyes, that vary widely in visual acuity.

The test is unlearnable. Many ingenious devices have been resorted to for the purpose of furnishing an unlearnable card of test letters. One of the earliest was Thomson's, in which the letters were arranged in radiating lines, only one of which could be exposed at one time. One of the late devices is Grow's, in which of 77 letters of similar size only one is exposed at a time. Various methods of exposing a single line at a time have also been devised. All such devices limit the number of arrangements of letters that can be used in each test without always making them really unlearnable. To defeat the ingenuity of candidates seeking to evade color tests Burch proposed to keep paints of the required colors, and paint in letters for each individual test. With the broken ring it is only needful to conceal the card and turn it; and a new test is obtained, as many times for the individual case as one chooses

But the practical advantages of having an unlearnable test are much greater than the mere avoidance of deception or self-deception. Instead of requiring the test-card to be kept where it cannot generally be seen, an important precaution with cards of test letters, the broken ring may be made perfectly familiar to the persons to be tested. The test may be explained and illustrated to a whole class, or a whole school; and each child may be drilled in how to answer, with the card close enough to be seen readily; before removing it to a distance where it will test the visual acuity to recognize it. With young children a great help to making the test accurate can be gained by emulation. When the test has been fully explained the card is removed beyond the distance it can be seen by any. Then

tell the children that as soon as any one can see which way the break is turned he is to raise his hand; and then point out different rings and see if the break is recognized. When one child has demonstrated his acuteness of vision he can be dismissed. Then the rings are turned and again brought nearer until another hand is raised, and so on until the last. If one test gives a doubtful result any number of tests can be made to confirm or correct it, because the test is unlearnable.

The test is more exact and easier to understand because it is made at a variable distance. On a card of test letters each line of letters is arranged for a certain fixed distance; and the person to be tested is always placed at a certain distance, usually 20 feet, and the test is to see which line of letters can be recognized at this distance. If one line is recognized vision = 20/20, if another 20/30. There is no provision in the plan for intermediate grades of visual acuity. So much has this defect been felt, that it is very common to make up for it by such expressions as 20/20 mostly, 20/20 partly, etc. But with the test card of broken rings of a single size the acuteness of vision is ascertained by noting the distance at which they can be seen; and this distance can be noted exactly to any fraction of a meter or foot, that seems desirable. There are no breaks in the series of visual acuities that are thus measurable. Testing the vision thus, with figures of standard size, and recording it as proportioned to the distance at which they are seen, is a procedure more readily understood and appreciated by the lay mind, than the statement of visual acuity as shown with the test card with letters of various sizes.

The apparatus required for the test is much simpler, less expensive and more convenient to handle than the card of test letters. The cards of test letters used for sight testing in the schools are usually 10 by 20 or more inches in size. The broken rings for testing sight at five meters may well be printed on a card 3 inches square, or three inches in diameter. Such reduction in the size of the card greatly reduces the expense and difficulty of distributing test cards. The broken ring card can be printed and sent to any school in the United States for less than it costs to send one of the large cards of test letters. Testing the sight of school children costs very little compared with the good it does. But to reduce its cost to the minimum will certainly help to get it generally adopted.

Method of Using the International Test.

The test is, to recognize the direction in which each ring is broken.

Hold the card quite close to the child, or children, and explain the test; pointing out the direction of the break in first one and then another ring; and get the child to indicate the direction by words, as "up," "down," etc., or by pointing with the finger.

Measure on the floor a line five meters long, marking each half meter. Hold the card at the distance of five meters, with a new side up. Point to one ring after another, getting the child to indicate the direction of the break in each.

If this cannot be done at 5 meters step, or let the child step, one-half meter closer, and try it there. If the break in the ring still cannot be seen, go another half-meter closer; and so on, until the break can be recognized in at least three-fourths of the rings.

The distance at which the break in the ring is recognized indicates the acuteness of vision. For instance; at 5 meters $V. = 1$; at $4\frac{1}{2}$ meters $V. = 0.9$; at 3 meters $V. = 0.6$; at $\frac{1}{2}$ meter $V. = 0.1$.

Care should be taken to avoid any mark on the face of the card, by which the child may learn in what direction the card and the rings are turned. With this precaution it is impossible to learn the test, since the card may be turned in either one of four directions. It may therefore be freely shown to the children to be tested; and they should be made thoroughly familiar with it before making the test, especially the younger children.

When making the test the card should not be placed in direct sun-light, but in the strongest light short of this, obtainable indoors. The light should not be directly behind the child, where it will give a reflection from the card; but to one side, so that any reflection from the card will not come to the child's eyes.

A NOTE ON ETHYLHYDROCUPREIN.*

BY

HOWARD F. HANSELL, M. D.

PHILADELPHIA.

Morgenroth & Levy (Berl. Klin. Wochens, 1911, bd. 34 & 44) were the first to call attention to the value of ethylhy-

drocuprein in the treatment of pneumococcus affections. Their article was followed by a second written by Morgenroth & Kaufman (*Centralb. f. Bacteriologie* bd. 54, 1912) and a third by Morgenroth & Ginsburg, (*Berl. Klin. Wochens.* 1913, bd. 8). Verlesen, (*Berl. Klin. Wochens.* 1913, bd. 32.) described the application of the remedy to the treatment of several cases of pneumonia and reported favorably. Schur, (*Klin. Monatsb. f. Augenh.* Oct. & Nov. 1913) also reported observations on the action of ethylhydrocuprein in *ulcus cornea serpens* caused by the pneumococcus.

Experimental investigations in the germicidal action of optochin (ethylhydrocuprein) on pneumococci were made by Gebb, (*Von Graefe, Arch. f. Ophthal.* 89, p. 29) who found that 2 per cent killed pneumococci at once in the test tube, 1 per cent after at least five minutes, $\frac{1}{2}$ per cent not at all after sixty minutes. In drop-dose experiments, even in 5 per cent solutions, it does not inhibit the growth of *xerosis bacilli* and its germicidal property on staphylococci is not worth mentioning. It checks the growth of the diplobacilli of *Morax-Axenfeld* but it is not as effective for them as for pneumococci.

Gradle stated (Meeting of the Chicago Ophthal. Society, April 20, 1914) that it had been recently shown that the pneumococcus in a twenty-four hour culture will assume one of three types: 1. Small, delicate, lanceolate, very virulent; 2. The larger diplococcus, somewhat more rounded, less virulent and more common. 3. Of luxurious growth, not highly virulent, and easily mistaken for the true streptococcus. The new drug, ethylhydrocuprein, is an absolute specific against the true pneumococcus in every respect. It has not a great penetrating power and we cannot use it in closed cavities because it is highly toxic. Its use in pneumococcus affections of the eye will cause them to disappear in two or three days.

Method of application: Kümmler, (*Muench. Med. Wochens.* p. 1326, 1914) after rendering the cornea anesthetic, applies a 2 per cent solution, holding it in contact with the ulcer for thirty seconds. He continues its use by instillations of 1 per cent solution into the conjunctival sac every hour. He reports 17 cases of *ulcus serpens* thus treated, which show clearly the good effects of the remedy, only one case proving obstinate.

Axenfeld & Plocher (*Deut. Med. Wochens.* July 15, 1915)

*Read before the Section on Ophthalmology, College of Physicians, Philadelphia, December 16, 1915.

also apply a 2 per cent solution directly to the affected area and do not use instillations into the sac.

In a case of hypopion ulcer (bacteria not stated) Wiener, (Medical Rec. Jan., 1914) applied a 1 per cent solution for thirty seconds every hour for six hours on the first day, and for twelve hours on the second day. Prior to its use the lacrimal sac and conjunctival sac were thoroughly cleansed by boric acid solution. The ulcer was healed in eighteen hours.

Goldschmidt (Muench. Med. Wochens, Vol. 11, p. 156) advises against the use of a stronger than a 2 per cent solution.

Clinical Results.

Ramsay (Ophthal. Rec. Sept., 1915), has used ethylhydrocuprein in 34 cases of seriginous ulcer. He says, "My personal experience amply confirms the favorable reports already published. Provided the pneumococcus is the infecting organism, cases treated by ethylhydrocuprein run a much shorter, and conspicuously more favorable course than did those dealt with in earlier days by the well recognized methods formerly in use. It happens occasionally that healing proceeds very slowly, or improvement may come to a standstill even in a case in which the pneumococcus has been demonstrated to be the cause of the ulcer. Under such circumstances it is well to be sure that the solution is freshly prepared, for the drug loses its efficiency so quickly that solutions more than a week old should not be employed."

Stengle (Klin. Monatsb. f. Augenh. Aug., 1915), had good results from instillations in two cases of serpens ulcer, a case of pneumococcus conjunctivitis, three cases of dacryocystitis and a number of cases of scrofulous and phlyctenular conjunctivitis.

Holth (Wochens. f. Thera. u. Hyg. des Auges, Vol. 17, p. 295) and Solowjef, (Zeit. f. Augenh. Vol. 31, p. 279) report excellent results.

Case.—The first time I saw this little girl of three years was at the end of her convalescence from measles. She was in the Children's Ward for contagious diseases at the Philadelphia General Hospital. The measles had not been unusually severe, had run its regular course and was unattended by any complication with the exception of an inflammation of the lid and cornea of the left eye. The conjunctiva was intensely red and edematous, the lid swollen to such a degree that it was difficult to evert it. The discharge was abundant and contained numerous pneu-

nococci. The culture showed no admixture of other cocci. The lower, outer third of the cornea was necrotic, the process extending laterally to include other portions of clear cornea, and deeply to invade fully one-half of the layers of the cornea. The necrotic mass was easily wiped away with a wad of cotton, exposing a gray, uneven base. Ethylhydrocuprein, 1 per cent, was ordered to be instilled every two hours day and night, and the eye frequently flushed with a weak bichloride of mercury solution. In twenty-four hours great improvement was evident. The process of ulceration had been checked, the discharge lessened, and the conjunctiva and lids were much less inflamed. At the end of twenty-four hours more the eye was practically well and the child was discharged from the hospital.

At the last inspection new tissue had replaced that destroyed by ulceration, the boundary line between the opaque and clear cornea was sharply defined and the lids and conjunctiva had regained their normal appearance.

THE RADICAL CATARACT OPERATION: CAUSES FOR ITS FAILURE AND HOW TO OVER- COME THEM.*

BY

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It needs no argument to establish the desirability of extracting the cataractous lens within its capsule if it is possible to do so with no greater danger to the eye than follows the capsulotomy operation. This is conceded by even the most ardent exponents of the latter method, and from the days of Daviel, in 1750, to the present time this desideratum has been striven for by ophthalmologists. In spite of recent advances in the technique of the classical operation, such as removal of a large section of the anterior capsule or preliminary capsulotomy and subsequent discission, the effort is still being made to perfect the technique for the removal of the lens within its capsule.

The radical operation which has received the most atten-

*Read before the Pacific Coast Oto-Ophthalmological Society, San Francisco, June, 1915.

tion from the profession is that which has been evolved by Colonel Henry Smith, of India. The various modifications of that method which have been suggested from time to time show no intrinsic fault with the Smith technique, but rather a misconception of the principles underlying the radical cataract operation. With a thorough knowledge of these principles and fairly good operative skill the need ceases to exist for dislocators, capsule forceps, needles, etc., for dislocating and delivering the lens, as the Smith delivery hook will do all and more than these devices can do, and do it more safely. For delivering the lens no method thus far devised has in our opinion been an improvement over or equal to Smith's.

The object of this paper is to point out the principal causes responsible for failure by those who attempt this operation, and the methods by which these failures may be largely avoided. From a careful review of the literature on the subject, together with a personal experience with the operation itself in India and a comparison of it as done in other parts of the world, we have reached the conclusion that the causes of failure are to be attributed to:

1. Improper incision.
2. Faulty technique in expressing the lens.
3. Inefficient control of the lids.
4. Improper after-treatment.

The technique here considered is the one we learned in India under the personal instruction of Colonel Henry Smith. It is applicable to all forms of senile cataract from the very incipient to the hypermature. While in some cases the simple extraction may be done, it will be found that the intact pupil offers more resistance to the delivery of the lens in its capsule, while offering greater opportunity for iris prolapse and consequent adhesions at the upper angle of the wound, resulting in a liability to glaucoma.

In India the combined operation is usually done as but few of the natives would submit to a two stage operation. Where it is possible, however, a preliminary iridectomy should be performed for it decreases the tendency to choroidal hemorrhage in a plus tension eye and gives a field comparatively free from blood during the delivery of the lens. A basal iridectomy, best done two or three weeks prior to the extraction, is an advantage in this operation as the incision can then be made in the sclera above the limbus, and the iris amputated near the

root; this would be more difficult to do with the corneal section which is made for the delivery of the lens.

The Incision.

The success of the operation largely depends upon the size of the incision. We desire particularly to emphasize the point that the incision must embrace the full half of the cornea. The average operator, accustomed to the capsulotomy operation, makes an incision which usually occupies the upper third of the cornea; but such an incision spells failure if done in the intracapsular operation where the entire lens within its capsule must come through the wound.

We recognize the difficulty confronting operators familiar with the old technique who are accustomed to the upper third incision, but if they are not willing to adopt the large incision the intracapsular operation should not be attempted. It is hard for the eye surgeon trained to make the comparatively small incision of the capsulotomy operation to depart from it so radically and make the very large one necessary in this; but the small incision, if made in an intracapsular extraction, means failure from the start and this must be fully understood and heeded, for it is not entirely the tough suspensory ligament which hinders the free delivery of the lens, but rather the forcing of the intact lens through the small opening. With the ordinary incision one of several things may occur:

1. Failure to deliver the lens.
2. Rupture of the capsule, leaving capsule lens matter behind.
3. Loss of vitreous before the lens is expelled.
4. Incarceration of the iris in the angles of the wound with a resultant drawn-up pupil.

Furthermore the pressure required to deliver the lens is infinitely greater if the incision is small than if made the proper size. One may readily satisfy himself as to this by a few experiments on the eyes of animals. The suspensory ligament of a young animal is much more resistant than in man at the age when senile cataracts usually occur; in spite of this it will be found that with an incision properly made the lens of the animal can be delivered intact within its capsule with comparative ease, but if the incision is small the same difficulties will be encountered as in the human eye.

The proper incision is made by grasping the conjunctiva as near the limbus as possible with a rather narrow fixation

forceps and pulling down the eye as far as the speculum will permit. The Smith or Graefe knife, held at an angle of 15° to 30° to the plane of the iris, is introduced 1 to $1\frac{1}{2}$ mm. from the limbus into the sclera, as near to the root of the iris as possible, and carried across the pupil so that the counter-puncture will mark the exact half of the circumference of the cornea. The incision is then carried upward with one continuous forward stroke, finishing in the cornea about $1\frac{1}{2}$ mm. from the limbus. If the incision is not completed in driving the knife to the hilt it can generally be finished by continuing the upward cut towards the point while withdrawing the instrument.

Delivery of the Lens.

This requires more technical skill than any other part of the operation, but it may be acquired by practice on animals' eyes and close attention to certain details. All solid cataracts are delivered in one way while Morgagnian cataracts require another method. During the examination of the eye it should be determined if the lens is solid, or if the nucleus is surrounded by a liquid substance,—Morgagnian. All varieties of senile cataract except the latter are delivered in the same manner, and here it must be understood that it is not the amount of pressure used in the intracapsular operation that determines a successful result, but the manner in which it is applied.

A small strabismus hook is used, the right angle end of which is not over 5 or 6 mm. long. This is placed flat on the lower part of the eye, its axis parallel to the long axis of the body, half above the lower border of the cornea and half below. Pressure is now steadily made towards the optic nerve. The instant the upper edge of the lens begins to present in the wound the hook is made to glide upwards following the lens, while the pressure is at the same time somewhat lessened. This is the critical point of the operation; failure to follow up the lens instantly may mean loss of vitreous and perhaps the lens slipping into the vitreous chamber. The knee of the hook, as it follows the lens, is gradually raised to an angle of about 45° to take its pressure from the vitreous, the point merely brushing the lens upward, the cornea being tucked underneath the lens to keep it from slipping back into the eye. When the equator of the lens has passed the lips of the wound it is gently lifted away with the concave surface of the hook.

The technique for delivering the Morgagnian type differs by laying the hook just above the lower border of the cornea

with the tip pointing directly into the eye. Pressure is then made simultaneously backwards toward the optic nerve and downwards towards the patient's feet. This ruptures the suspensory ligament below and causes the lens to turn a somersault, the lower edge appearing first in the wound. As in the delivery of the solid type, as soon as the edge of the lens appears the hook follows up and tucks the cornea beneath, and the lens is finally lifted away with the concave surface of the hook.

Control of the Lids.

The one factor more than any other that has hindered the more general adoption of the radical cataract operation has been the difficulty in controlling the lids. Specula have quite properly been considered dangerous in cataract operations; lid hooks, whether single or double, though comparatively safe while in position yet require to be removed and reintroduced at various stages of the operation, during which time the eye is endangered, while they interfere when the incision is to be made and almost preclude completing the operation with a proper toilet. In fact, all the methods heretofore in use either do not give a good exposure or where they do expose the field sufficiently do not insure against danger from the patient squeezing and expelling the ocular contents.

No small part of Colonel Smith's success has been due to his native assistant who has traveled the great highway of experience step by step with his master and thus gained his own training. Few operators can hope to attain results such as Smith has obtained if dependent upon assistants whose training must necessarily be brief. Any improvement, therefore, which will replace a skill due to long experience should be considered a step in advance.

With this in view our endeavors have led us to devise a form of elevating speculum which will allow an assistant, after having become familiar with the technique of the radical operation, to assist the operator equally well as does Smith's native co-worker who acquired his digital skill only after years of practice. By maintaining the lids in the desired position and under absolute control throughout the operation, this new speculum will prevent loss of vitreous by squeezing on the part of the patient and will permit the operator the maximum extent of field for his manipulations.

With this speculum, used with ordinary intelligence, the

eye is more secure and safe from loss of vitreous throughout the operation than is even afforded by the lid hook in the hands of Smith's highly trained assistant. The blades are raised from the eyeball so that they just clear it and are kept in this position all the time it is in the cul de sac. The hand holding the instrument is firmly steadied against the cheek of the patient, the only caution required being not to allow the blades to touch the eye. The lids are separated as widely as possible without causing discomfort to the patient. It thus gives the perfect exposure of the ordinary speculum with absolute safety from any pressure. It enables the operator to do his work without losing control of the lids for even an instant, from the time of making the incision until the completion of the toilet, which latter can be done infinitely better than is possible where lid hooks are used.

Our use of this speculum is the only departure from Smith's technique. While adhering to the principle of raising the lids away from the globe, it does so in a more simple manner and without the need for an assistant who must be highly trained for this particular service. It is introduced at the beginning of the operation and not removed until the toilet is completed; if the incision is made large enough and care taken to stroke out the pillars of the iris, no drawn-up pupil is likely to follow.

One very important feature of its use is its value in completing the operation with a thorough toilet. This is particularly difficult in the intracapsular operation on account of the danger from the loss of vitreous, for although the loss of vitreous can occur at any stage of a cataract operation by any method through the patient suddenly squeezing or through improper manipulations by the operator, this danger is always to be apprehended in the intracapsular method on account of the lack of support that the posterior capsule gives the vitreous. When the loss of vitreous does occur it is very difficult with the usual technique to complete the toilet properly, but when this speculum is in place the toilet can be adequately finished in a satisfactory manner, no matter what may occur.

The toilet being completed, the pillars of the iris straightened out, and the pupil central, the speculum is carefully removed from the eye and the patient directed to shut the eyes gently as though going to sleep and to keep them closed. The lower lid is then slightly pulled down and an antiseptic one-half

per cent eserine ointment is introduced into the lower cul de sac; the eyes are then bandaged. The eserine will keep the pupil central and prevent prolapse of the iris if the after-treatment is carefully carried out.

After-Treatment.

The operation that has been conducted successfully may still be ruined if the after-treatment is improperly carried out. Here again old methods must be abandoned. The bandages must not be disturbed or the eye inspected for at least five days after the operation. If the lens has been delivered without rupturing the capsule and the technique conducted with surgical asepsis there need be no fear of infection or even of iritis, in the slightest degree. A daily inspection serves no further purpose than to gratify curiosity and may do a great deal of harm. Even on the fifth day the only procedure permissible is to gently draw down the lower lid to apply an antiseptic ointment in the lower cul de sac and to break the monotony and reassure the patient, but under no circumstances should the patient be directed to look down.

It is a mistake to consider a wound securely healed in twenty-four hours; in a week, even, the wound may readily be stretched or opened, resulting in a very high degree of astigmatism or an incarceration of the iris. We have known both of these conditions to occur on the seventh and the ninth day respectively. During our interne days we saw a perineal wound, after it had healed by primary union, completely reopened by the introduction of a speculum fourteen days after operation. If this can occur in such a wound with large opposing surfaces and supported by sutures, it may be readily understood that a corneal wound with its very thin opposing edges and without support from sutures may also be stretched or opened by the powerful downward traction of the inferior rectus.

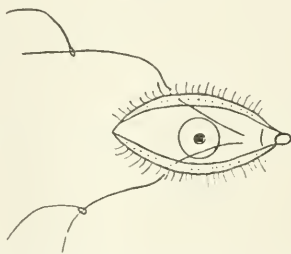
We repeat, therefore, that the eyes must be kept bandaged for the first five days, the antiseptic ointment introduced on the fifth day without causing the patient to look down for the purpose of inspecting the wound, and the eyes again bandaged for five days more. The patient is kept in bed for the first twenty-four hours, may have a back-rest for the next four days, and finally sit up in a chair on the fifth day. The bandages are removed on the tenth day but the patient must be cautioned against looking down and must be careful not to strain during

the next few weeks. This may seem like going to extremes in the after-care, but the results amply justify it.

In conclusion, it is not to be expected that the same proficiency will be acquired here that is possible in India, where there is such an abundance of living human clinical material. Careful attention, however, to the points made in this paper and practice on animals' eyes should enable a fairly skillful operator to perform the radical cataract operation with greater satisfaction to himself and to his patient than usually follows the capsulotomy method.

A TENSION SUTURE FOR ADVANCEMENT OPERATIONS.

BY
HAROLD GIFFORD, M. D.,
OMAHA.



Tension Suture for Advancement Operations.
Advancement Sutures Omitted to Avoid Confusion. (Gifford.)

When the *internal* rectus is advanced, the tension on the sutures can be fairly well relieved by the customary practice of putting a stitch through the opposite tendon or a fold of conjunctiva and attaching it to the bridge of the nose or to a thread from the outside of the other eye. But when the *external* rectus is advanced, the eye cannot be rotated outward by a thread attached to the internal side of the eye and the skin of the temple, on account of the danger of injury to the cornea.

To meet this difficulty I have for some years been using a suture (ordinary black silk, size D, with two needles) put in as follows: After finishing my advancement operation, a firm hold is obtained with the fixation forceps on the tendon of the internal rectus, and one needle is passed through this and through the center of the free border of one lid and out well below the lashes, at about the junction of the middle and the outer third. The other needle is then passed through a corresponding part of the other lid. The ball is then rotated

outward till the insertion of the tendon is about under the points where the lids are penetrated by the thread, and the latter is tied just tightly enough to bring the lids down to the surface of the globe. I remove this stitch after from five to seven days. Sometimes it cuts through the tendon by that time.

For picking up the tendon through the uncut conjunctiva, forceps with sharp projecting teeth are desirable.

Since using this tension suture my advancement results have improved decidedly. It will, I think, be found of use no matter what form of advancement or tucking may be employed.

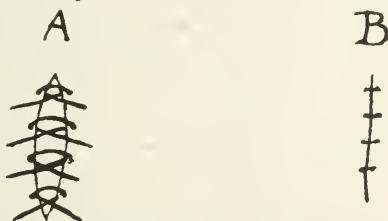
A BURIED KNOT CONJUNCTIVAL SUTURE.

BY

RODERIC O'CONNOR, M. D.

OAKLAND, CAL.

Reasoning that a great deal of the discomfort and pain, after operations that require conjunctival sutures, is due to the irritation produced by the knot of the suture material I con-



(A) Showing method of passing the sutures.

(B) Showing appearance after entire wound is sutured. Entire absence of knots.

ceived the idea of burying the knot and using an absorbable material such as triple 0 catgut or finely shredded kangaroo tendon.

The needle pierces one margin from underneath crosses over and pierces the other margin from without. As the knot is tied the loose conjunctiva everts easily and when the ends are cut it returns to its normal position carrying the knot with it. I prefer kangaroo tendon as it can be made much finer than the finest catgut and is softer.

I have tried this on a number of cases of my advancement and in one was able to allow the patient to entirely dispense with even a monocular bandage. She was a girl of twelve and was able to use her eyes without any pain whatever. The same occurred in another case of operation on a superior rectus in which cases there is usually a great deal of pain from knot irritation.

I have no idea whether or not I am the first to propose this suture, but I have never seen it described in the books or literature.

SKIN GRAFTING. THE USE OF VASELINE IN CUTTING AND THE OPEN AIR TREATMENT OF THIERSCH GRAFTS.*

BY

WALTER R. PARKER, B. S., M. D.

DETROIT, MICH.

Skin grafting has been employed for the repair of various defects since the days of ancient Egypt and India. The first systematic treatise on plastic surgery did not appear, however, until 1597 when Gasper Tagiacozi published his famous work. The next publication on the subject of any importance appeared in 1869 when Reverdin presented his communication to the Society of Surgery, in Paris, at which time he showed a patient on whom he practiced epidermic grafting, with small bits of skin, on a granulation surface. While LeFort, in 1872, transplanted a whole thickness flap from the arm for the relief of an ectropion, and Thiersch in 1874 successfully grafted a piece of skin 1 cm. in diameter, it was not until 1875 when Wolfe reported a successful plastic operation for the repair of a lower lid, that the interest in the subject became at all general. Since the last named publication appeared, whole thickness skin grafts are usually spoken of as Wolfe grafts.

In 1886 Thiersch proved that the healing of fresh or granulating wounds could be accomplished by covering the defect with large films of epidermis, transferred from any part of the body. His method, now so familiar to all, revolutionized skin grafting.

Many suggestions have been offered as to the best way of treatment of skin grafts, but on the other hand comparatively few changes have been made of late years, in the method of preparation of the surface or of the manner of cutting.

The treatment has varied from beating the skin to produce a plethora as advocated by the old Indian method, and later sanctioned by Hirschberg, to the greatest delicacy in manipulation. We now know the beating of the skin leads to discoloration due to broken down blood elements and should be

*Read by invitation before the Chicago Ophthalmological Society, November 15, 1915.

avoided. On the other hand no especial care in handling seems necessary other than to avoid infection. The usual preparation is as follows: The part to be excised is shaved and scrubbed carefully with soap and water, sponged with ether or alcohol, followed by the use of a solution of bichloride of mercury or Harrington solution, and finally washed with a salt solution and covered with a sterile gauze dressing moistened with a normal salt solution.

The first suggestion I wish to make is that, after the surface has been prepared as above described, the skin and knife be smeared with a thin coating of sterile vaseline. By this means the tendency of the skin to move with the knife is practically all eliminated and one of the greatest difficulties in the successful cutting of grafts thereby obviated. As all my experience has been in correcting defects in and about the eyelids, the grafts have been small, varying in size from 12 to 25 mm. to 25 to 50 mm. I cannot see, however, why the same advantage would not obtain in grafts of any size. So far as I have been able to judge the use of vaseline has not interfered with the healing process in a single case, nor have I seen a complication I could attribute to its use. My experience includes 12 operations, being far too limited to permit of more than a suggestion with the hope that others will help test the method.

The surface to be repaired needs careful preparation. After the hemorrhage has been entirely controlled the surface should be allowed to glaze over and be kept as dry as possible. The large arteries should be tied off and hot water may be used to control the oozing. If, while adjusting the grafts, the surface is injured and the oozing of blood results, it is better to remove the grafts entirely and delay the operation until the surface is free from blood, even if it takes several hours. If the delay is for a short time the graft may be kept in the open air or in a normal salt solution. The graft retains its vitality for so long that the length of time between the cutting and application need not be considered. But when once in place the graft should be disturbed as little as possible. If the delay is for several hours and the grafts are small, fresh ones may be cut. This can be done if the razor is sharp, without the administration of an anaesthetic with very little discomfort to the patient.

The grafts should cover the entire surface without tension

in any direction. If several grafts be required they should overlap one another slightly as well as the skin margin. No one thing delays the immediate result more than to leave small denuded areas either between the grafts or at the skin margin. The line of union between the grafts and between graft and skin is dusted over with aristol.

I have had very limited experience with grafting on granulating surfaces. According to Davis, "Thiersch grafts of whatever size will take just as well, if not better, upon a healthy granulating surface as upon a fresh wound."

There must always be an over-correction. For instance, in repairing the skin of the lower lid, after the wound has been prepared the lid margin should be drawn up over the upper lid far enough to smooth out the entire surface to be grafted and held in the position by sutures passed through the lid margin in such a way as not to include the edge of the wound.

There have been many suggestions as to the best method of dressing. My early cases were dressed with rubber protective covered with moist or dry gauze, all held in place by a bandage. This protective was either perforated or laid on in narrow strips overlapping slightly. While some of the results were good, not infrequently they were far from satisfactory. However carefully the dressings were removed the grafts were occasionally disturbed or the retained secretion had floated them from their base. In 1908 I used the open air treatment for the first time. The grafted area was surrounded with a roll of gauze, held in place by adhesive plaster, over which a layer of the same material was placed, to protect the part from dust. I now use a somewhat concave piece of aluminum which has been freely perforated. This is held in place by strips of adhesive plaster and covered with gauze. No dressings are used except the dusting powder. The results have been so very satisfactory that I have adopted the open air treatment routinely and cannot recommend it too highly. I am well aware there is nothing new in this suggestion, but I believe this method of treatment is not employed as frequently as it should be. Bruning, in 1904, advocated it, and claimed the grafts were much less frequently disturbed and the subsequent shrinkage less than when treated by other methods. That the grafts are less frequently displaced, there can be no doubt. Whether the shrinkage is less than in the successful "takes" treated by the other methods, I am not prepared to say.

My experience in the use of open air treatment covers in all thirty patients and forty-two operations.

The cases were all from my service in the Ophthalmic Clinic of the University of Michigan, and were classified as follows:

Ectropion cicatricial	11
Ectropion hypertrophic	5
Carcinoma, basal cell.....	10
Carcinoma, squamous cell.....	1
Epitheloma	3

Total.....30

As this paper deals only with the method of cutting and treatment of grafts, I shall not speak of the final results in the malignant cases, more than to say they were surprisingly good.

SOME OBSERVATIONS ON THE OPERATION OF IRIDOTASIS FOR GLAUCOMA.

BY

DUNBAR ROY, M. D.,

ATLANTA, GA.

The question of the pathogenesis of glaucoma is still unsettled. There is also no unanimity as to the operative procedure giving the best results. There is also some diversity of opinion as to whether operative results in chronic glaucoma are any better than those obtained by the thorough use of myotics. These questions I do not propose to discuss. Clinical observation and experience must be the final arbiters for each individual. If, then the ophthalmologist believes that some operative interference will best subserve the interests of the patient suffering from acute or chronic glaucoma, the question will also arise as to which of the many operations proposed will give the best results. Here again must be admitted the personal equation of the operator, his clinical opportunities and familiarity in technique. At present it must be acknowledged that the so-called trephine operation holds the first place. This is far from being the ideal operation and yet if we may judge from the literature on glaucoma the large majority of ophthalmologists prefer this to all others.

In 1911 Dr. Johan Borthen, of Bergen, Norway, published an article which was translated in Knapp's Arch. of Ophthalmology, in which he described an operation for chronic

glaucoma that had been used by him for two years and which he called iridotaxis. It was a modification of the Holt's operation of iridencleisis. The simplicity and ease of the operation appealed to me especially after reading Borthen's most excellent results and in a limited number of cases the writer has had universally better results than by any other operation. In the South one does not see nearly so many cases of glaucoma as he sees in the Northern and especially in the large European clinics.

Racial susceptibility to this disease must be an acknowledged fact. Borthen claims almost universally good results in those cases of chronic glaucoma without inflammatory signs. Personally the writer has operated upon both the acute and chronic forms of glaucoma by the method of iridotaxis and while it was eminently successful in both forms, I must say that in the chronic non-inflammatory forms it has seemed to me to be the ideal operation. Many of you no doubt are familiar with the technique of this operation. In the acute inflammatory cases it is frequently necessary to use a general anesthetic just as is done in other operations. I must say that the results here are no better than the old classical broad peripheral iridectomy of Graefe which to my mind gives equally as good results as the trephine operation.

The only advantage in the iridotaxis operation, is the avoidance of a possible hemorrhage into the anterior chamber which may occur in either of the two other operations. In the simple non-inflammatory forms of glaucoma the use of cocaine as an anesthetic is all sufficient. The necessary aseptic precautions being taken, a small conjunctival flap is made with the scissors and undermined as close to the sclero-corneal margin as possible. It is not necessary to use the knife in order to expose the edge of the cornea as is done in the trephine operation.

An assistant grasps this flap with forceps and holds it taut perpendicular to the ball. A small keratome is passed into the anterior chamber at the sclero-corneal margin under the flap, making a cut just large enough for the entrance of a pair of iris forceps. These latter are then passed into the anterior chamber, the pupillary margin of the iris is grasped and gently drawn into the wound so that just a small piece of the iris remains caught in the incision. The flap is replaced without suture, the eye filled with bichloride vaseline and the

bandage applied. Borthen suggests atropine immediately following the operation, but this I have never used. Usually when the bandage is removed the next day there is scarcely any irritation. Just a small black spot of iris is seen beneath the flap. I have never had a case where the iris slipped back into the anterior chamber and this the writer thinks is due to the making of as small an incision as possible into the anterior chamber. It is best to keep the eye bandaged for three or four days. The immediate result is the softening of the eyeball and the tension remains practically normal.

I have operated upon nine eyes in five patients, all of which have relieved the symptoms and where the case was not so far advanced as to show some atrophic changes in the nerve, the vision has either improved or remained the same.

It is unnecessary to detail these cases which would consume too much time. I shall only narrate the salient features in each and give the final results.

Case I. Mrs. G., age 55. History showed all the symptoms of glaucoma for several years. The right eye had been removed six years ago for intense pain due evidently to the same condition. Intense periodic pain in left eye without relief by any treatment. Examination showed a dilated pupil, no congestion and with the tonometer, greatly increased tension. Media clear, cupping of the disc, with grayish white atrophy. Vision was only fingers at 2 feet. March 1, 1912, under cocain, iridotasis was performed. This was my first operation. Its simplicity appealed to me. There was immediate relief from pain and a softening of the ball. There has been no increase of tension since that time and when seen in April of this year the patient was perfectly comfortable. The vision has remained the same.

Case II. Mrs. M., age 52. Chronic non-inflammatory glaucoma of both eyes. Practically no anterior chamber. Iris bombè. Tension showed almost stony hardness. Intense periodic pains. Right eye showed atrophy of optic nerve with no vision. Left eye partial atrophy with cupping, fingers at 5 feet. Operation of iridotasis on both eyes under cocain on May 5th, 1912. Immediate lowering of tension to almost normal, relief of pains. The vision has remained the same. This case has been followed for three years and the patient remains perfectly comfortable.

Case III. Mrs. R., of Thomasville, Ga., age 49. First

seen March 7, 1912, for periodic pains and obscuration of vision. Had been wearing glasses for several years. Right eye $V=20/100$, with correction $20/70$. Left eye $V=20/50$, with correction $20/30$. Right eye was giving her most trouble. Pupil dilated, anterior chamber shallow, the tonometer showing a decided increase in tension. There were also some atrophic signs in the nerve. Marked contraction of the field of vision. Tests on the left eye showed no signs of glaucoma. The patient being opposed to an operation, eserine sulphate and iodide of potash were prescribed and the patient returned to her home. Improvement was only temporary. Urgent symptoms arising, the patient returned to the city on July 17, 1912. Iridotomy was performed on the right eye. Immediate relief of all symptoms. Seven months later the patient returned with all the symptoms of glaucoma in the left eye, increased tension, shallow anterior chamber, rainbow circles and periodic pains and vision reduced to $20/50$ with correction. Iridotomy was immediately performed with most excellent results. In Sept. 15th, 1914, this patient came to the city at my request and both eyes examined. The history showed that the eyes had been perfectly comfortable. Tension was normal in both eyes. Vision in first eye operated upon with correction was $20/50$ and in the last one was $20/40$.

Case IV. Mrs. N., of Jackson, Ga., age 52. On May 11, 1914, the writer saw this patient in consultation at the hospital where she had been for a week suffering from supposedly trifacial neuralgia. Glaucoma had not been suspected. On examination the writer found a case of acute inflammatory glaucoma of both eyes. Tension taken by palpation showed a marked increase and all the other symptoms of the disease. Vision was only the counting of fingers at 3 feet, in both eyes. Immediate operation advised and performed under general anesthesia as the patient was frightfully nervous. Iridotomy performed on both eyes. This was the first case where I had used this operation in the acute inflammatory form. All the intense symptoms disappeared immediately after the operation and the patient left the hospital in one week. The result was most satisfactory. Six weeks later the patient returned for examination. Both eyes were white, a good anterior chamber and the tonometer showed practically a normal tension. Vision in both eyes was $20/20$ with correction. This patient was seen two weeks ago. The subconjunctival blebs

of iris are quite distinct and the vision remains the same.

Case V. C. H., male, age 62. This patient has been having failure of vision for several years with occasional mists before his eyes, accompanied by neuralgic pains. Examination Dec. 5, 1915, showed vision of 20/50 in right eye not improved with glasses. Anterior chamber shallow and a decided increase in tension as shown by the tonometer. Pupil dilated. Ophthalmoscope showed a decided cupping and some appearances of atrophy. Left eye, V=20/70 with very much the same symptoms as the right. Operation of iridotasis performed the next day. Healing uneventful. A marked betterment of all symptoms. Two months later the patient was again examined. Right eye V=20/40 with correction. Left eye V=20/50 with correction. Tension is normal. Relief of all pains and a slight widening of his visual field.

I am fully aware that these few cases do not warrant me in assuming that this operation would be successful in every case or even that it is the best operation but certainly it is just as worthy of trial as any other operation which has been proposed for this insidious eye disease.

There is no universally ideal operation for glaucoma. Each ophthalmologist has his own special technique which he considers the best for this class of cases. There is an eminently distinguished number of our profession who do not think that any operation is indicated in those cases of chronic non-inflammatory glaucoma accompanied by a gradual narrowing of the field and a diminution of the central vision. They hold that just as much good is accomplished by the proper use of myotics as is obtained by any operative intervention.

The writer believes that most men are agreed that nothing short of some well recognized procedure should be attempted in those cases of acute fulminating glaucoma. Personally the writer has discarded the use of myotics except as an adjuvant for he believes in immediate operation in every case of well recognized acute and chronic glaucoma.

The diagnosis of a slow grade chronic non-inflammatory glaucoma is not always easy. The writer always uses the Schiötz tonometer but this only as an aid. When various careful observers place the normal tension all the way from 15 to 30 mm. of mercury, it is proper to conclude that there is a great variation as to what might be called increased tension as measured with this instrument. The use of this instrument takes time and exactness and unless such be exercised its find-

ings are by no means definite. Frequent perimetric examinations are to me more important than the tonometer in those cases of slowly progressive non-inflammatory glaucoma. No one experiences trouble in the diagnosis of the acute inflammatory type and no one in the writer's opinion should delay an immediate operation. The operation of iridotaxis either has not appealed to American ophthalmologists or they are not acquainted with its technique. With the exception of the cases reported by Harrower before the American Ophthalmological Society I can find no American report.

In 1912 W. Gilbert reported twelve cases operated by the method of iridotaxis at the Munich University Eye Clinic. Gilbert's report is by no means favorable and yet he concludes his article with these words "iridotaxis in glaucoma simplex and in rare cases of chronic inflammatory glaucoma regulates the intra-ocular pressure quickly, completely and permanently but there are various defects such as the sinking back of the stretched iris, dislocation of the pupils and too large blisters." This is certainly a combination of strange statements. I do not believe the operator will have a sinking back of the stretched iris if he uses the precaution to make a very small sclero-corneal incision. The dislocation of the pupils I do not consider a defect any more than occurs with any other operation. Too large blisters are not necessary unless the operator thus wishes to have them. Harrower has made two communications in both of which he is enthusiastic over this operation.

Last fall I wrote to Dr. Borthen because it was said that he had discontinued this operation. So interesting was his reply that I quote the following sentence from his letter. "Since 1908 I have in all performed iridotaxis in 242 cases with so highly satisfactory results that I have not felt inclined to try any other. I am convinced that the reduction of tension is due not to filtration but to increased drainage through Fontana's spaces in direct consequence of stretching of the iris. It is quite unnecessary to make the conjunctival flap larger than just sufficient to cover the incarcerated iris."

In conclusion the writer would say that in his opinion there are good arguments favoring the use of this operation.

1. Its simplicity and ease of technique.

2. The immediate result in relieving all the symptoms, which is just as permanent as that obtained by any other operation.

3. Freedom from irritation in the healing of the eye.

A SIMPLE OPERATION FOR CONTRACTED SOCKET.

BY

F. H. VERHOEFF, M. D.

BOSTON, MASS.

(From the Massachusetts Charitable Eye and Ear Infirmary.)

Until within the past few years my attempts to enlarge contracted sockets so that they would retain artificial eyes were highly unsuccessful except in the simplest cases. This experience seems to be very general, judging by the cases I have seen in the practice of my colleagues. The following operation, however, that I devised about three years ago, has given such satisfactory results that I am now always confident of success no matter how great the contraction of the socket. While so far as I know the use of a large glass ball for retaining a skin graft in position and moulding the shape of the socket has not previously been described, the procedure is so simple and effective that it is probable that others have also employed it.

The operation is performed under general anesthesia. The orbital cavity is dried with cotton and then swabbed out freely with tincture of iodine, which is also painted over the skin of the lids and surrounding parts. If the palpebral orifice is smaller than that of the normal eye it is enlarged to the proper size by a canthotomy. Then the orbital cavity is enlarged by dissecting away all the scar tissue present within it. If this does not make the cavity of sufficient size, the normal conjunctiva, if any is present, should be undermined so that it will spread away from the denuded area or areas. If necessary some of the underlying tissue including even orbital fat should be removed. If the palpebral conjunctiva is drawn away from the lid, either upper or lower, as is often the case, it should be undermined as far as the lid margin and enough tissue removed from beneath it to make the lid sufficiently thin. The dissection would not be difficult were it not that the field is always bloody. To obviate this as far as possible I sometimes employ constant irrigation. Large bleeding vessels should if possible be occluded by twisting, not by tying them.

After the dissection is completed, the cavity is freed from blood clots and a large glass ball quickly placed in it. The purpose of this is to check further bleeding so that the cavity will be dry when the skin graft is ready. The glass ball should be at least 18.5 mm. in diameter and fit the cavity snugly, without, however, forcing the lids apart. If it does not permit easy closure of the lids, the distention of the orbital tissues is

too great and the cavity should be further enlarged. A Thiersch graft should now be cut from the inner surface of the thigh, preferably in one large piece sufficient completely to cover the glass ball. I have obtained good results, however, by overlapping several small pieces. The graft is spread out on a doubled sheet of Cargile membrane and closely applied to a glass ball of the same size as that in the orbit, so that there are two layers of Cargile membrane between the graft and the ball. The glass ball in the orbit is removed and the cavity sponged out again if necessary, though as a rule by this time it is dry. If a slight amount of oozing persists it seems to do no harm. The glass ball bearing the Cargile membrane and graft is now inserted into the cavity. The free edges of the graft are then rearranged with forceps, and if the graft is unnecessarily large the excess cut off. If a canthotomy has been done, care should be taken to spread the graft over the lips of the wound. The lids are now closed together and both eyes bandaged. I have not found it necessary to sew the lids together.

Both eyes are kept bandaged for at least four days. The bandage may be changed daily, but the lids should not be opened. Usually they are stuck together by dried secretion after 24 hours. At the end of five days the glass ball is carefully pried out and the Cargile membrane removed. The latter has no tendency to adhere to the graft but may adhere to any bare spot present. The glass ball, after being cleaned with alcohol, is covered with White's bichloride of mercury ointment and replaced in the orbital cavity. A single bandage is now applied. In the course of a few days it will be found that the glass ball will tend to project between the lids owing to contraction of the orbital tissue. This should be combated by applying a flannel pressure bandage.

The glass ball should be removed and cleaned every two or three days. At the end of two or three weeks from the time of operation, the ball may be removed and replaced by an artificial eye. The greater the extent of surface that has been grafted the longer the time the glass ball should be left in. A Snellen reform eye should be selected and should be kept in the orbit day and night. The orbital tissue soon adjusts itself to the shape of the eye. If through mistake the artificial eye should be left out too long and the socket become too small, the latter may be enlarged again in the course of a few days by inserting a glass ball and keeping it under pressure with a tight

flannel bandage. The ease with which this may be done is remarkable.

In some cases there may be a small area in which the graft fails to adhere. This is usually in the vicinity of the outer canthus where contact with the glass ball is apt to be imperfect. The granulations, which arise in about ten days from such areas, should be snipped off and their bases cauterized with the silver nitrate stick, after which the glass ball should be replaced and kept under pressure.

In cutting the skin graft, I have found Parker's procedure of first smearing the skin with sterile vaseline to be most helpful. The use of Cargile membrane as a support for the graft I believe to be important, for in the one case in which I omitted it the result was unsatisfactory. It is possible, however, that this case may have misled me. In dissecting out the orbital cavity the important details are to remove all the scar tissue, to make the cavity sufficiently large, and not to leave the lids too thick. In one case in which the orbital cavity was completely obliterated, I dissected away not only all the scar tissue but also a considerable amount of orbital fat, thus making an entirely new cavity. This case was really simpler than others in which a certain amount of normal conjunctiva remained, and the result was most satisfactory. In certain cases, especially where there was preexisting entropion or ectropion, I find it advantageous to fix the palpebral conjunctiva in the fornix by passing double armed sutures through the conjunctiva and lids and tying them outside.

If owing to insufficient dissection or any other reason the cavity finally resulting is too small, the operation may be repeated. In cases in which an ample upper sulcus has been obtained but in which the lower remains too shallow, it might be well to enlarge the latter by Maxwell's operation. However, I have not yet found this necessary.

A NEW STEREOSCOPIC EXERCISE CARD FOR STIMULATING BINOCULAR FUSION.

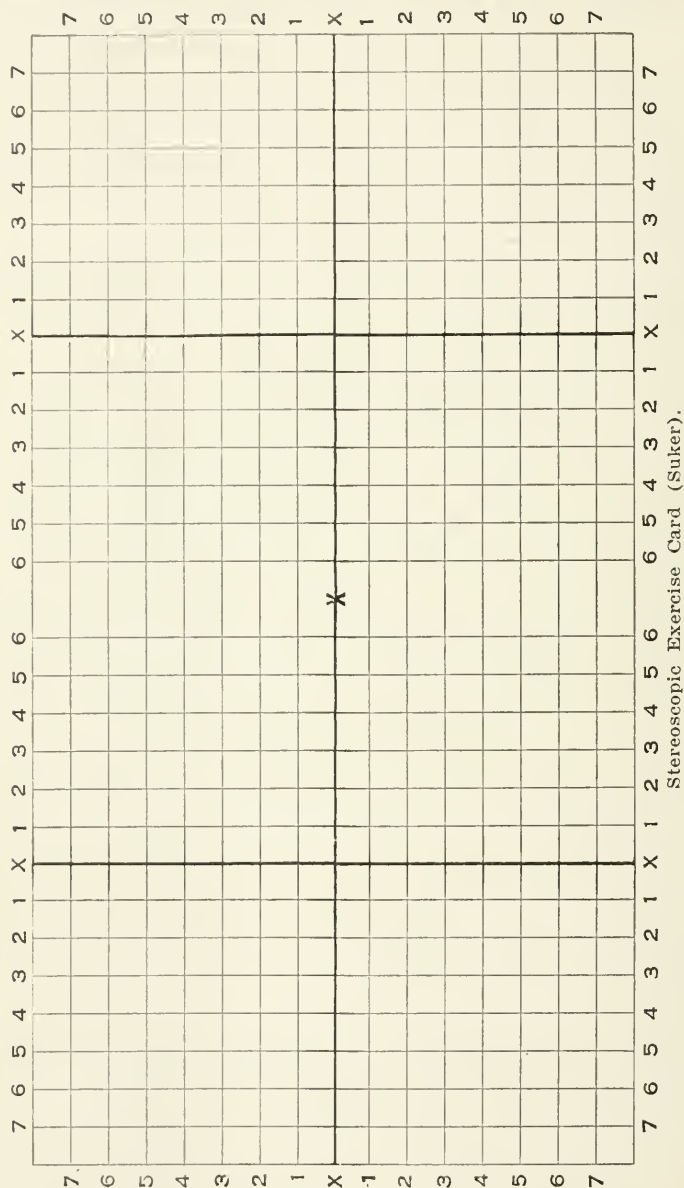
BY

GEORGE F. SUKER, M. D.

CHICAGO.

So many of the stereoscopic exercise cards now in use do not permit any flexibility in the arrangement of the pictures used in the exercise for stimulating binocular fusion; or, any flexibility for the development of the muscle tone in the various

exo or esophorias. Then too, the little patients as well as others lose more or less interest in the fixed picture cards; while, with



this one, the interest is held because the patient himself can make any variety of pictures or drawings with which he can exercise,

From the cut here given, one can see that the scheme is very simple and can readily be used by anyone. The card is of the usual size used for the ordinary stereoscope—that is $3\frac{1}{4}$ inches by $5\frac{3}{4}$ inches.

The rulings, both vertical and horizontal, are numbered from the central vertical and central horizontal lines in both directions, thus enabling one-half of a picture to be drawn on one end of the card above or on the central horizontal line, and the other half to be drawn on the other end of the card, below or on the central horizontal line and equally distant from the central vertical lines which are indicated by an X. The two halves of the picture when seen through a stereoscope by normal eyes, form a complete picture.

Children may draw their own pictures or they may cut pictures from periodicals and mount one-half of this picture on one end of the card, above or on the central horizontal line, and the other half on the other end of the card, below or on the central horizontal line, in such a position as to be correctly viewed through a stereoscope.

The two halves of the picture may be separated as much as desired to induce either divergence or convergence, depending upon whether there is a convergency or divergency of the eyes, thus causing the weak muscles to be exercised and binocular fusion encouraged.

For insufficiencies of the vertical muscles the half of each picture must be drawn in squares equally distant from the central vertical line and also equally distant above and below the central horizontal line, these lines being indicated by an X.

For insufficiencies of the horizontal muscles each half of the picture must be equidistant from the central vertical line and just above and below the central horizontal line.

If the squint be convergent (inward) the halves of the picture must be placed quite close together. This will cause a relaxation of the internal recti and contraction of the external recti muscles of the eyes.

If the squint be divergent (outward), the halves of the pictures must be separated a little. This will cause a contraction of the internal and a corresponding relaxation of the external muscles.

Thus, it is possible to so place the halves of the pictures that a little stress will be put upon either pair of weak muscles

or on those that we wish to exercise and thereby develop. The desire of the child to see a single or complete picture makes this stress available. It also makes it possible to stimulate binocular fusion, for the two half pictures must be superimposed in order to be fused if a complete picture is to be seen.

As soon as binocular fusion is established the pictures may be mounted either closer together or farther apart, as the case requires: thus, putting a little more stress upon the weak muscles and in this manner build them up to normal strength.

To further assist in the correction of the insufficiencies and also stimulate fusion, the card can be slowly carried either beyond or within the point at which there is a superimposition or fusion and still maintain the latter. This permits a gradual increase or decrease in convergence, thus materially assisting the development of the weaker set of muscles. By carrying the fused picture beyond or within the fusion point is, in a measure, equivalent to either increasing or decreasing the separation of the pictures drawn at the central vertical or horizontal lines.

For these exercises it is necessary that the distance between the stereoscope lenses is equal to the pupillary distance of the patient.

The cards are made by F. A. Hardy & Co., Chicago, and are inexpensive.

REPORT OF A CASE OF POST-DIPHTHERITIC PARESIS OF THE EXTERNAL RECTUS CURED BY ANTITOXIN.

BY
ALBERT MASON, M. D.

WAYCROSS, GEORGIA.

Pareses and paralysees of ocular muscles secondary to diphtheria usually respond to treatment slowly. The average case recovers anywhere from five or six weeks to as many months under ascending doses of strychnine, combined with electricity and "mixed treatment." In the following case, in which diphtheria antitoxin was used as a specific, a complete cure occurred in seven days. In so far as I have been able to ascertain no similar case has been recorded in the literature, and I report this, that those with large hospital and dispensary practices may give the treatment a trial and report the results.

Miss M. T., age 15, a school girl, came in on September

6, 1915, complaining of diplopia and headache. Previous history: Measles and whooping-cough when a small child; diphtheria four years ago. Present illness: Sixteen days ago she complained of sore throat, which was diagnosed by her family physician as diphtheria. There being no antitoxin in the small town, antitoxin was not used until the next day, when 10,000 units were given. The next day 5,000 were given in the morning, and 2,000 in the afternoon. After this last dose there was no more membrane formed. The patient left her bed a couple of days later. Seven days ago she developed diplopia and headache over her eyes.

Examination: Patient sits with her head turned towards the right a little. Pupils are 4 mm., react to light and accommodation. The right eye squints in, and its movement outward is limited. There is an esophoria of 8 degrees for distance. Eye grounds are normal. Under homatropine her refraction is V. R. 20/70 w. plus 1.00s. plus .25 cyl. axis 80 degrees equals 20/15. V. L. 20/70 w. plus 1.00s. equals 20/20.

There was no question in my mind but that this was a paresis secondary to diphtheria, and it occurred to me that, this being the case, antitoxin would act specifically and result in a cure much sooner than the usual remedies. As the patient was not prepared to stay in town, she went home to return in a few days. On September 9, seventeen days since the last dose of antitoxin, and the tenth day of the diplopia, esophoria was still 8 degrees. I gave her 500 units of antitoxin, injected very slowly into the buttocks. September 11, 500 units as before; esophoria 7 degrees. September 12, esophoria 4 degrees. No diplopia; no headache. September 13, 500 units as before; esophoria 4 degrees. September 15, esophoria 3 degrees. Glasses prescribed. September 20, esophoria with glasses $2\frac{1}{2}$ degrees; without glasses 3 degrees. October 11, same results. No diplopia since September 11.

Her esophoria remaining 3 degrees after September 15, we may take this to be her normal muscular condition and consider the case cured on that date.

AN UNUSUAL MAGNET EXTRACTION.

BY

JAMES ROYAL SMITH, M. D.

CHICAGO.

On November 26, 1915, W. O. was hammering on steel with a punch. A fragment of the metal was chipped off and

he was struck in the left eye. The following day when the case came under observation there was a small red patch on the conjunctiva, at the upper part near the inner canthus. Otherwise the eye seemed normal. Vision both eyes 20/30.

X-ray examination looked suspicious of a substance in the eye. When Dr. Sweet's localizer was used, the particle appeared to be in the anterior part of the vitreous chamber, in the upper and nasal side.

Ophthalmoscopy demonstrated a splinter of steel in the posterior part of the eyeball in the vitreous. A small choroidal wound was seen in the region of the macula where it had first lodged.

On the day following the accident an unsuccessful attempt was made to extract the steel through a scleral opening. Five days afterwards the operation was repeated. The steel could not be removed, when the idea of applying the force of the magnet at another axis, viz., in the direction of the long axis of the fragment, was suggested by Dr. Frank Allport. The head of the patient was turned to the extreme left and the magnet applied from above at an oblique angle. The steel was removed at once.

It is fair to believe that in the unsuccessful attempts at removal the splinter of steel which was 3 or 4 mm. in length was attracted broadside by the magnet and each time was drawn with its long axis across the scleral opening.

At the last attempt the end of the fragment was attracted first. Perhaps other cases of magnet extraction could be made easier or be successful after repeated trials if the direction of application of force be changed, or the position of the eye changed by turning the head to one side or the other.

Haab was the first to advance this suggestion, though he was not an advocate of the scleral route. It is better policy to attract the foreign body in the line you wish it to travel and perhaps vary the direction of the application of the force, for as is well known the magnetic force decreases as the object is removed from the pole.

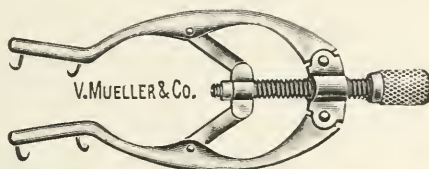
A LACHRYMAL SAC RETRACTOR.

BY

GLEN CAMPBELL, M. D.

VANCOUVER, B. C.

The operation of extirpation of the lachrymal sac requires the use of a good retractor. Finding the retractors in use much too cumbersome and the desire to have a much smaller



Lachrymal Sac Retractor (Campbell).

and lighter instrument, a modification of the little instrument of Wilder's for opening the scleral wound, suggested itself in size and mode of action, as a suitable instrument for that purpose.

The above cut shows the instrument made with the necessary modification for the purpose intended, the side pieces being extended a few millimeters and two pairs of claws attached. The cut is natural size and the instrument weighs only $56\frac{1}{2}$ grains.

Messrs. V. Mueller & Co., of Chicago, made the mechanism of opening and closing the instrument in a simpler manner than is used in the Wilder instrument, to all of whom I owe my thanks.

BOOK NOTICE

The Description of an Ophthalmoscope, being an English translation of Von Helmholtz's "Beschreibung eines Augenspiegels" (Berlin 1851) by Thomas Hall Shastid, A. B., A. M., M. D., LL. B., F. A. C. S., Superior, Wisconsin, and the first translation of this classic into any language. Cloth, 33 pages. Chicago, Cleveland Press, 1916.

This book represents a labor of love on the part of Dr. Shastid and is dedicated to Casey A. Wood. Ophthalmologists in America will now have the opportunity to become familiar with the very foundation of our specialty

REPORTS OF SOCIETIES

CHICAGO OPHTHALMOLOGICAL SOCIETY.

RICHARD J. TIVNEN, M. D., PRESIDENT.

DECEMBER 20, 1915.

A Peculiar Corneal Condition.

Dr. J. A. Pratt, Aurora, Illinois, reported the case of Mr. H., who came to him October 12 last with the following history: In April of this year, while feeding cattle, he was struck in the eye with a piece of cornstalk. The eye became red, sensitive to light, with scalding tears, but no other discharge. These acute symptoms lasted for two weeks and then subsided. At different times, until August 24, the eye would smart and tear. On August 24, patient consulted a physician who gives the following history: "Mr. H. came to have his eyes fitted for glasses. The vision in each eye was 20/80, and with correction 20/20. In illuminating the pupil a well defined spot about the size of the diameter of a pin could be seen in the center of the pupil of the right eye. September 25, he returned to me with all the appearances of a well marked ulcer of the cornea, including a slight hypopion and a slight deposit on Descemet's membrane. I noticed that the central part of the ulcer or deposit in the cornea was not broken down as much as one would expect it to be judging from appearances, inflammatory symptoms and purulent secretion present. I cauterized the central portion of the surface with carbolic acid and immediately observed that the surface was only partly broken down, since the size of the deposit was about the size of a medium pupil, while the depression was about the size of a pin head.

Under six days' local and general treatment the ulceration and hypopion disappeared. As the inflammatory symptoms continued I used atropin, one per cent, with no result. but with the crystals of atropin the pupil dilated completely and was easily maintained. The spot in the cornea remained, and in two weeks changed its shape from an oblong with long diameter perpendicular to an oval with the long diameter in a horizontal direction, without any change in the inflammatory symptoms."

When the patient consulted Dr. Pratt the second day after leaving Dr. L., there was intense pain around the right eye; the iris was adherent to the lens in the position in which

it was now found, which was about the size of a normal pupil. A little below the center of the pupil was a well defined deposit in the anterior third of the cornea, about 2 x 1 mm. with the axis perpendicular, and looking very much like a corneal abscess. It was cut down upon and found to be a yellowish-white tissue. There was hardly a haziness of the cornea around it. There was lachrymation and photophobia and intense pain at night which was due to the iritis present, and which subsided after using atropin (2 per cent) at home every four hours, and atropin and dionin powder once a day at the office. Under this active treatment the iris still remains fixed. The patient states that for one week of the time he was with Dr. L. he did not go to bed on account of the intense pain.

November 22 the patient was taken to the National Pathological Laboratory in Chicago; the cornea was opened and the tissue scraped, but the findings were negative. Wassermann finding was negative.

The deposit has now assumed a pear-shape with a diameter of 2 mm. each way, so that it is gradually enlarging. The cornea is also becoming hazy around the deposit. The inflammatory symptoms are mild and the patient sleeps well at night.

Dr. Pratt brought the case before the Society for advice and diagnosis.

DISCUSSION.

Dr. Oliver Tydings recalled having a case many years ago of primary melano-sarcoma of the cornea in which the iris was invaginated. In the case reported by Dr. Pratt he understood there was no wound. The corneal tissue is not prone to malignancy, and personally he would continue the treatment the doctor had been giving, namely, atropin, dionin and heat to see if the case did not improve.

Dr. George F. Suker asked what the microscopic findings showed.

Dr. Pratt replied that they were absolutely negative. New tissue had taken the place of corneal tissue. It was increasing in size and the haziness of the cornea around it is becoming greater, although the man sees better because the iris is drawing away in the upper part.

Tuberculosis of the Eye; With Special Reference to Treatment.

By Wm. E. Gamble, M. D., Chicago.

(Reported in full in the February, 1916, OPTHALMIC RECORD.)

DISCUSSION.

Dr. William H. Wilder said the essayist had wisely called attention to the danger that might result from the diagnostic use of tuberculin, for all had seen instances where tuberculin had been used indiscreetly. It would seem, however, if certain precautions were observed the danger might be comparatively insignificant. Too frequently the observer, thinking the case to be one of tuberculosis of the eye resorts to the diagnostic use of tuberculin without first having made a careful physical examination of the patient. Such an examination should be complete enough to exclude other possible causes of inflammation of the eye such as foci of infection in teeth, tonsils, prostate, etc.

It stands to reason that there will be great danger in the use of diagnostic doses of tuberculin if the patient has an actual cavity in the lungs, or shows an active tuberculous process in the joints or vertebrae, or elsewhere. Such possibilities should be borne in mind. Furthermore, it is indiscreet to administer diagnostic doses of tuberculin without having a normal temperature record for several days preceding the use of the first dose.

He thinks that if such precautions are observed there will be fewer accidents to record and fewer cases in which the eye trouble is aggravated.

Again, there are certain conditions in the eye that may be recognized clinically as tuberculous in which it may not be necessary to administer the diagnostic dose of tuberculin except possibly as confirmation of one's suspicions. Such are certain choroidal conditions, certain conditions of the cornea and sclera like sclerosing keratitis, kerato-scleritis and inflammation of the iris in which tuberculous masses may be actually seen.

Unfortunately for our diagnosis these well defined clinical cases are not as numerous as the more obscure ones, in which we desire to get the help that comes from the diagnostic test with tuberculin.

As to the administration of the diagnostic dose of tuberculin after the patient has been prepared for it by a careful physical examination and a few days test of the body temperature, he thinks in the very large majority of cases we are safe in administering one-half milligram of old tuberculin. Koch himself advised the use of one milligram as the initial dose.

If this produces no general nor local reaction and no rise in temperature, it should be followed in twenty-four or forty-

eight hours with a dose of three milligrams. If this produces no general nor local reaction nor rise of temperature, the final dose of five milligrams may be given in twenty-four hours, and if no reaction follows, the assumption is that no active focus of tuberculosis is present. If, however, there is a distinct reaction at the point of puncture, the evidence of local or general reaction should be looked for very carefully and a rise of temperature of one degree or even less may be very suggestive, so that the next dose, if one is given, should be smaller than originally planned.

If a local reaction occurs in the eye with the suspected lesion, it will manifest itself by ciliary injection or an increase if ciliary injection was already present. Unfortunately in many cases where this test is made, the eye is already so inflamed that it is difficult to detect the difference in the redness that might be caused by the local reaction and hence the value of the test is more or less problematical and we must reason from the general reaction that the eye lesion is probably tuberculous. The previous exclusion of an active tuberculous lesion by physical examination is therefore of great value.

One important point to remember in connection with the tuberculin test is the possibility of anaphylaxis. If one waits for a considerable time between the initial and the second dose the patient may show an anaphylactic reaction. For this reason it is wise to proceed within forty-eight hours if necessary, with the administration of the second dose, and then within twenty-four hours or thirty-six hours the third dose to avoid the danger of anaphylaxis.

Dr. George F. Suker said in reference to certain forms of parenchymatous or phlyctenular keratitis and nodular or phlyctenular conjunctivitis of low grade in which the physical findings are not marked, no diagnosis of tuberculosis should be made without a complete physical examination, this to include a skiagram of the chest. He has on many occasions had chest skiagrams made of children and young adults in whom there was but a faint suspicion of tuberculosis and found enlarged peribronchial glands. When such patients were subjected to the tuberculin test, they usually gave a marked reaction and many times locally. And, under the tuberculin treatment these cases made a good recovery. We should resort to the diagnostic tuberculin reaction test only at the very last—only when all other aids for a diagnosis of tuberculosis fail.

These low grade tuberculous inflammations of the conjunctiva and cornea do not always show the tubercle bacillus but are the result of the toxic agent of tuberculosis engendered somewhere in the body. In the absence of the bacillus in the eye lesion, the tuberculin test does not always give a local reaction.

In reference to the therapeutic dose of tuberculin in the treatment of these cases, he believes in giving small doses and only increasing same when no temperature reaction follows the injection. The interval between injections must not be too short—usually one injection a week is sufficient in conjunction with the other measures employed.

Dr. E. K. Findlay saw the cases of tuberculous optic neuritis referred to by Dr. Gamble and was deeply impressed with the result of the tuberculin treatment. His attention was called to the pronounced reduction of sight that followed a large dose of tuberculin in the case of optic neuritis. Since that time the speaker has never found any focal reaction in a number of cases in which he has given tuberculin. He was pleased that the essayist had given definite directions regarding the size of the diagnostic dose as there was so much confusion on that point. The remarks regarding standardizing the various preparations on the market deserve consideration, as the inert preparations may account for many of the discouraging results that have followed this method of treatment.

Dr. L. W. Dean, of Iowa City, Iowa, said that whenever it is necessary to make tuberculin tests it is quite essential to have made first a thorough systemic examination. All of his patients needing tuberculin tests are taken as house cases, whether they are private or clinic patients, and kept in the hospital for three or four days.

Previous to the tuberculin tests a complete systemic examination is made by a competent internist. This obviates the danger of a serious reaction because of gross pulmonary or other tubercular lesion. His procedure with this class of cases is as follows: First, the sinuses, nose and throat are carefully examined, then the teeth are looked after by a dentist. The patient is then placed in the hands of the internist and examined by him before the tuberculin test is applied; the internist determining whether it is safe to make the tuberculin test or not. With the completion of the general examination the patient has a second careful examination of the eyes and if advisable the tuberculin tests are applied.

In many cases it is necessary to have a careful examination of the prostate, bladder and kidney.

In a number of cases the cause of the trouble has been located by the genito-urinary specialist. Unfortunately, even with clinic patients in Iowa it is difficult to get a very complete cystoscopic examination made because of objections on the part of the patient. Some of our patients have even refused treatment before they would undergo this examination.

Dr. Dean mentioned several instances where in the presence of positive Wassermann reactions with positive tuberculin reactions the patient has only done well with the use of the tuberculin therapy.

Dr. Oliver Tydings expressed himself as being fully in accord with Dr. Dean in insisting on making a more thorough examination of everything possible. It is necessary to make these investigations, particularly with regard to the condition of the sinuses and teeth and the intestinal tract in cases of luetic infection.

With regard to some of the manifestations of tuberculosis of endogenous origin, such as phlyctenules and scleritis and conditions within the globe producing retinitis proliferans, etc., due to endotoxins, he is fully in harmony with Dr. Wilder.

As to the use of tuberculin in the various conditions, since the introduction of tuberculin in this country he has used it extensively. He has heard the warning of physicians in cases in which it can, and in cases in which it should not, be used; that it must not be used in fevers or in hemorrhagic conditions, and great care must be exercised in using it, nevertheless he has used it in hemorrhagic conditions of the lung; he has used it in fevers and in similar conditions, and he does not know of any condition which is due to a tubercular process in which the judicious use of tuberculin is not beneficial. He has never seen any ill results from the judicious use of it.

He has had two cases of anaphylaxis following the use of tuberculin, but these occurred in days when very little was known about the use of tuberculin, and these cases occurred in forty-eight hours of one another. Both of them were alarming for a time, and were the only two cases he has seen.

Dr. Michael Goldenburg related his experience experimentally with tuberculin five or six years ago when phlyctenular disease was thought to be due to tuberculosis. He used then the Von Pirquet reaction and got a positive reaction in nearly

every case, and concluded then that he could get that sort of reaction with other microorganisms made by the same process, such as the colon bacillus and staphylococcus. He made two Von Pirquets and one colon vaccination, and the peculiar thing was he only had a reaction from the tuberculin and no reaction in the other. He did the same thing with the staphylococcus and got the same results. He then consulted a number of bacteriologists in Chicago, who thought probably he did not use the proper organisms, that he should use an organism that has an intracellular secretion and suggested the use of the Klebs-Loeffler bacillus or the streptococcus, so he had this made up by the same process. He used these organisms in a great number of cases and did not get a reaction in any of them, but did get a reaction with the tuberculin.

While he is inclined to think the Von Pirquet reaction is of value, yet at the present we are unable to interpret the picture presented with any degree of value from a practical standpoint. According to some authorities, Wolf-Eisner and others who have on several occasions dissected out these tissues have found atypical tubercle, tubercular caseation, giant cells and surrounding infiltration.

Dr. Richard J. Tivnen reiterated the remarks of Dr. Tydings relative to tuberculin which is a very potent agent. He agreed with Dr. Dean that the patient should undergo a complete physical examination before subjecting him to the diagnostic dose of tuberculin and subsequent therapeutic treatment.

So far as the reactions are concerned local and focal general or constitutional, he has not had very much focal reaction. He had occasion to study a series of phlyctenular cases five years ago, and he then used the Von Pirquet test, and like Dr. Goldenburg he had obtained a large number of positive responses to this test, but only a very small number of focal reactions.

In his judgment phlyctenular disease is a tubercular process. The syndrome these cases present is classical of the tubercular process. The crux about phlyctenules which causes trouble, is their recurrence, and he thinks tuberculin is as useful in controlling these recurrences as any agent at our command. If he were asked what was the most important agent in the treatment of tuberculosis, not only in the eye, but in general work he should put at the head of the list tuberculin. However, in the use of tuberculin the greatest care should be

exercised, particularly with reference to the variations in the temperature curve, both before administering the diagnostic dose and during the therapeutic course of treatment. As to the dose itself, it is safer to banish the notion of there being a definite dose and rather individualize. Great wisdom should be shown in the selection of cases. The product is extremely important. He has used mostly the Lucius and Brunning product, which is quite generally employed. He had enjoyed Dr. Gamble's instructive and scientific paper very much indeed.

Dr. Gamble (in closing the discussion) said that the danger of dissemination of tubercle bacilli from the use of tuberculin is causing a reaction against its use in phthisis pulmonalis, and in tuberculous cavities in other parts of the body. Diagnostic doses cause an increase of tuberculous areas in the lungs, as shown by radiograms taken before and after subcutaneous injection. Tubercle bacilli are seen in the sputum after injection when not found before. It is in small isolated foci, as in the eye, that this treatment is of undoubted value and has come to stay.

Werli a few years ago demonstrated that the appearance of tubercle bacilli in chronic tuberculosis varies from that of the acute type. He spoke of them having a granular appearance, that is, some defect or variation in paths and capsule. He devised a different stain by which he could identify them.

The author has never had anaphylactic symptoms from the use of tuberculin.

Intracapsular Cataract Operation.

Dr. William A. Fisher reported three cases on which he had operated for cataract by the intracapsular method, in order to let the members observe the condition of the eyes after the operation and note the visual results.

These patients were operated upon October 7 before the members of the Academy of Ophthalmology and Otolaryngology at their annual meeting. An iridectomy was made at the time of the operation in each case, without introducing the iris forceps into the anterior chamber—the Smith method. The three extractions were performed without accident or complication. There was no pain or postoperative inflammation in any of them, and the bandages were not disturbed for nine days. At the end of the ninth day the bandages were removed, the anterior chambers were reformed, the corneal wounds were closed, there was no iris prolapse in either of them, and the only treatment they received after the bandages were omitted

was to keep the eyes clean and wear smoked glasses. They all counted fingers at about five feet when the bandages were removed. Their total time in the hospital after operation was 58 days, an average of 19 days.

The histories of these three cases are as follows:

Case 1. Mr. D., aged 74. Mature cataract right eye. Referred by his brother, Dr. Davey, Chicago. October 7, intracapsular operation; left hospital October 21 with vision 20/30 with pinhole. Referred him to Dr. Pendelton, Quincy, Illinois, where he lives, to be refracted. A letter from Dr. Pendelton November 25, 1915, says, that Mr. D. has vision 20/20 with plus 10.00, and that the ophthalmometer does not show any astigmatism.

Case 2. Mrs. E., aged 70. Mature cataract. Referred by Dr. Mundt, Chicago. October 7, intracapsular cataract operation; patient left hospital October 29, 1915. December 20, 1915 her vision is 20/20 with plus 11.00 combined with plus 2.00 ax. 30.

He was unable to present this patient to the Society on account of her age, and because the Society meets at night.

Case 3. This patient was presented for inspection. Miss W., aged 55, mature cataract of right eye. Referred by Dr. Tydings, Chicago. October 7, intracapsular cataract operation; patient left hospital October 29. December 20, 1915, her vision with plus 10.00 is 20/20.

Repigmentation of an Inflammatory Depigmented Iris.

Dr. Harry S. Gradle reported the case of a patient, 45 years old, who had his first attack of iritis in the left eye in 1907. Five years later a second attack occurred. In October, 1915, patient suffered a third attack, during the course of which the left iris became depigmented, changing from its former brown to a perfect blue color. The inflammation subsided rapidly after exenteration of his hyperplastic ethmoids, leaving a blue iris with incomplete posterior annular synechiae. Within three weeks after the inflammation disappeared, brown pigment granules, identified under the corneal microscope as chromatophores, began to make their appearance at the periphery of the iris, eventually forming a solid brown ring around an otherwise blue iris. This ring is gradually advancing toward the pupillary edge, while the remaining iris stroma is studded with individual chromatophores.

PAUL GUILFORD,
Secretary.

PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

MEETING OF NOVEMBER 15, 1915.

Glaucoma.

Dr. G. Clyde Markel presented a case of glaucoma in a male negro of 42. There was a history of luetic infection at twenty which had received some local treatment. About a year ago, he noticed that at times the vision was hazy and dim but he paid little attention to this as he could continue his daily work, that of porter. When his vision became worse, he consulted Dr. Markel. At that time, March, 1915, vision of the right eye was hand movements at two feet; the left 20/70 and Jaeger 2 at 15 inches; pupils equal, slightly dilated, very sluggish to light and accommodation. O. D., media clear, disc round, white and atrophic with large excavation in center, the vessels bending slightly over the edge; arteries and veins diminished in caliber. O. S. the same but less marked. Right field could not be determined; left showed contraction up and in of 25°, up and out of 15°. Tension 45 mm. in each eye. A Wassermann test was entirely negative, several different antigens being used. Vision has gradually decreased since.

Gumma of Iris.

Dr. Joseph E. Willettes presented a case of iritis that he believed was gummatous; Wassermann test had not yet been made.

Dr. Stieren thought the condition might be either tubercular, malignant or a gumma and advised thorough laboratory tests before making a diagnosis. He had once performed an iridectomy for the removal of a nodule in the iris with little or no inflammatory phenomena and later discovered that it had been a gumma.

Dr. Heckel said that it was best to make a diagnosis by the clinical appearance first and then obtain laboratory aid if necessary. He thought that in this case, the pinkish color of the nodule with the preceding iridic adhesions almost assured a diagnosis of gumma.

Double Detachment of Retina.

Dr. Edward A. Weisser presented a case of detachment of the retina in both eyes in a youth of 17. Three years before, he had been struck on the back of the head with a brick. Three months after he had noticed gradual failure of the vision of the right eye, this getting worse until the vision was quite

poor. He consulted an ophthalmologist and was put to bed for seven weeks receiving internal treatment and sweats; nothing further was done. A year later he noticed a similar failure of vision in the left eye. When seen by Dr. Weisser recently, the condition was as follows: O. D. V. 3/60. O. S. V. 3/60. Iris reflexes normal; media clear; both eyes showed a well marked area of detached retina below. Laboratory tests, including Wassermann, were negative.

Injury from Coal.

Dr. E. E. Wible presented John H., 42, coal miner, who had been struck in the left eye with a piece of coal two weeks before. Pain, lachrymation and failing vision followed. When shown, there was peri-corneal injection, photophobia and an opaque lens, parts of which projected into the anterior chamber. Under atropin, cold applications and rest, absorption of the lens was expected.

Dr. Heckel stated that he had seen a coal miner recently who had a piece of coal in the eye that had lodged in the cornea, the inner end extending into the anterior chamber; the external layers of the cornea had healed over the foreign body; the lens was opaque. He extracted the lens leaving the piece of coal in place; later, when the eye had recovered, he made a corneal incision and removed the piece of coal with iris forceps.

Optic Atrophy.

Dr. G. E. Curry reported a case, a man of 51, whose vision in the right eye began to fail six years ago; in three years the eye was practically blind. For four years the patient suffered from severe headaches during which time, he took each week, a dollar bottle of Bromo-Seltzer. At 17, he had contracted syphilis and received more or less treatment for a year. He had been a hard drinker until 35 but a total abstainer since. When first examined the vision was O. D. 12/200, O. S. 20/20. The ophthalmoscope showed marked optic atrophy, the discs being pale and the vessels narrowed. The left eye seemed to be as bad as the right except that the vessels were of better caliber. The right field was decidedly contracted but the left was good for both form and color except above and in where it showed some contraction. The pupils were small (2 mm.) and had very slight reaction to light. Knee jerks were absent. Wassermann test positive. The patient was a big, strong, healthy looking man and actively at work every day. Since first seen two years ago, he has had mercury and potassium iodid almost

constantly; his general condition is good. Vision is now 18/200 in the right eye and 20/20 in the left eye; there is no change in the fundi.

Glioma of Retina.

Dr. E. A. Weisser reported a case of a boy whose eye had to all appearances been affected with suppurative choroiditis but which proved to be glioma after the eye had been enucleated and examined microscopically. Eight months before, the boy, aged six, began to complain of poor vision of the left eye; soon after, the mother noticed that the pupil was dilated and yellowish in color. The eye was painful from time to time, and there was slight injection, photophobia and increased lachrymation. Family and personal history were negative. When first seen, the right eye seemed normal except for 8.50 D. hyperopia by retinoscopy; the left eye had clear media, the pupil was dilated ad maximum and stationary, anterior chamber was shallow and the posterior third of the globe showed a dirty dark-yellowish mass, of different levels throughout. The eye was totally blind, the mother stating that she believed the eye had been blind for four months. The child was normal physically and laboratory tests were negative.

Total Inversion of the Iris.

Dr. Edward Stieren reported a case of eye injury in which there had resulted a complete inversion of the iris, being the second case of this nature which he has seen.

The injury was caused by a steel rivet striking the eye with great force causing an incomplete rupture of the cornea which extended diagonally across its entire width.

After the hemorrhage which filled the anterior chamber had absorbed no vestige of the iris could be seen.

There was considerable pain with marked blepharospasm so that the tenometer could not be used. T. + 1.

The eye was trephined at the end of three weeks, resulting in relief of pain and marked benefit in the blepharospasm.

The lens and media were unaffected.

ADOLPH KREBS,
Reporter.

COLORADO OPHTHALMOLOGICAL SOCIETY.

W. H. CRISP, M. D., PRESIDING.

DECEMBER 18TH, 1915.

Argyrosis. Polypoid Granulations at Outer Canthus.

Dr. Edward Jackson presented Mr. S., aged 47. Vision and eye-grounds normal. Left eye, staining of inner surface of lower lid with polypoid granulation on lid margins near outer canthus. Has used solution of silver salt about a year for chronic inflammation. Upper lid smooth. Right eye normal.

DISCUSSION.

Dr. E. R. Neeper: I have case very similar to the one shown and the meibomian ducts are involved.

Dr. W. L. Hess believed that the irritation of the tears would account for the trouble at the outer canthus.

Dr. J. A. Patterson suggested that it might possibly be due to staphylococcus infection.

Dr. C. A. Ringle was of the impression that the silver had been used longer than directed.

Dr. W. H. Crisp thought that the solution must have been a strong one. Noticed band from internal canthus to cornea.

Dr. C. E. Walker said that years ago silver was used much more extensively than now. Rarely used it stronger than 2 grs. to 1 oz.

Dr. Jackson said that he would probably take a section of the polypoid growth and submit it to microscopic examination.

Dr. E. T. Boyd remarked that such cases of argyrosis should serve as a warning to us to exercise more care in the prescribing of silver salts and cited a case in which marked staining of the sclera corresponding to the lower cul-de-sac had taken place, the result of long continued use of a strong solution of argyrol.

Dr. Neeper stated that he now had a case with argyrosis from argyrol, but that he was continuing its use because nothing else could be found to control the chronic condition.

Macular Burn from Sun-gazing.

Dr. Melville Black presented a young man 33 years of age who, three years ago, while a soldier in the regular army, entered into a sun gazing contest with three other soldiers. They were endeavoring to see which one could look at the sun the longest without winking. This man won the contest and

acquired a burn of the macular region of each eye which caused a relative scotoma, which reduced his central vision to one-half of normal and made it necessary for him to retire from the army. With the ophthalmoscope in each macular region is seen a spot about one-fourth the size of the disc which is lighter in color than the surrounding retina. Its edges are well defined and its surface has a delicate mottling. The relative scotoma is 10° in diameter. The sun gazing caused a scotoma in one of the other men, but he recovered and continued in the service. The other two did not look at the sun long enough to do them any harm."

DISCUSSION.

Dr. J. A. Patterson had had a case with macular changes from snow blindness.

Dr. Otis Orendorff recalled the case presented by him one year ago in which macular changes had taken place, the result of snow-blindness.

Dr. W. F. Matson believed the case to be similar to snow-blindness.

Dr. E. T. Boyd said that his observation did not indicate that fundus changes often took place as a result of snow-blindness, and Dr. Jackson suggested that it was because the exposure was not of sufficient duration.

— The question arose as to what changes the direct rays of the sun would produce, and Dr. Jackson said that if sufficiently prolonged they would cause coagulation of the albumen in the tissues.

Dr. W. H. Crisp believed the changes to be of a chemical nature.

Dr. A. C. Magruder stated that he and a confrere had been using helio-therapy for various conditions, and that in some of the cases the treatment had to be suspended because of the oedema produced, which they had attributed to the heat rays.

Dr. W. L. Hess cited Birch-Hirschfeld's views wherein he says, in referring to blinding by the sun's rays, that "There is a swelling and warping of the outer segments of the rods and cones, followed very soon by a swelling and hyperchromatosis of the bodies of the rods and cones and a distinct involvement of the pigment epithelium and the choroid." As to cause, he ascribes the chief importance to the luminous rays.

(Continued.)

Editor OPHTHALMIC RECORD:

I did not see the original article by Dr. Harman, but I assume it was a repetition of the statement of Dr. George Poulaine published in *Cosmos* (Paris) 1906, from which I quote: "The theory makes it easy to understand the reinversion of the retinal image. The double curve effects a complete reversal of the order of the nerve fibers both from top to bottom and from right to left, the two half turns being exactly equivalent to a half twist or rotation through 180° about the axis of the bundle."

Individual anatomical variations of all parts of the human body are frequently discovered by surgeons. The location and number of the branches of the arteries, veins, and nerves are not the same in different individuals. Is it reasonable to presume that the optic nerves are an exception to this rule? If not, then there are many people whose optic nerves do not twist the exact 180° required. Moreover, the theory is based on the misconception that we see the image, not on the retina, as the tactile reinversion theory presumes, but at some other portion of the cranium.

I must take exception to Mr. Prentice's statement also. It is a repetition of the old idea of tactile correction of an incorrect visual impression, I maintain that there is no break in the contemporaneous development of the *organ of seeing* and the *psychical act of seeing*.

In testing an eye with a mature cataract to decide the advisability of operating one determines not only if it possesses light perception, but also if *light projection* is present. This power means that the eye is able to localize a luminous object. The mind refers the sensation in the direction of its source. In the evolution of the primitive eye there must have been a stage where this was the limit of visual acuity. This outward reference of sensation is common to tactile sense and all the refinements of special senses which have developed therefrom. As the primitive pigment spot became cupped this ability to localize was increased. The development of a lens focuses this irritant point on an extremely small area of the retina and if two adjacent areas fall upon different rods and cones two sensations are received. One does not see an *image* anywhere either on retina, chiasm or cortex.

Each luminous point of which the object is composed irritates a conjugate point of the retina and is referred back along

the central line of each pencil of rays to its source in the luminous object, and thus the object is reproduced by an innumerable number of such points and the object is seen erect because each of its component parts is in its place.

For elucidation of this theory the reader is referred to LeConte, Joseph, L. L. D.: *Sight*, D. Appleton & Co., New York. Dennett: *Vision*, Wood's Reference Hand-Book Medical Sciences. Wells: *Psychology Applied to Medicine*, F. A. Davis Co., Philadelphia. The author will be glad to send reprint of a paper published in *Ophthalmology*, April, 1907.

DAVID W. WELLS.

Boston, Mass., Jan. 28, 1916.

JACKSON'S ARTICLE.

Dr. Jackson's article on "Cards for Sight Testing in Schools" is another reminder of the fact that our present method of testing vision is quite inaccurate and unscientific. To be sure it seems to answer our purpose fairly well, and it is a hard matter to readjust ourselves to new and better conditions, but if we must acknowledge the truth, we will all be compelled to admit that the letters of the alphabet, even if constructed on the most accurate principles, are *not* an exact method of vision testing. We all know that even when no astigmatism is present, certain letters can be seen easier than others, while if astigmatism is present with all of its varieties, regular and irregular, the interpretation of the variously directed lines in the charted letters is both weird and variable. The letters of the alphabet have served a useful and convenient purpose for sight-testing up to the present time; but merely because they have been used for many years in the past is no good reason why we should go on using them in the future, especially when we know and acknowledge their inconvenience, and have better and more scientific methods at hand. There is no more reason in hanging on to first traditions in this matter, than there would be for us to shut our eyes to modern progress along other lines of medical and surgical advancement.

While no one can forecast the future and prophesy what method of vision testing will be used years hence, we can at least consider the situation at the present time, and it would seem as if the "Broken Ring" method of Landolt, was the simplest and most accurate method under consideration for the scientific testing of vision.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. James Royal Smith of Chicago has been appointed to the staff of the Chicago Orphan Asylum.

Dr. Allen Greenwood of Boston has returned home after six months' service in an eye hospital in France.

Dr. DeWitt C. Bryant has given up practice in Omaha and moved to his ranch at Clearmont, California.

Twenty-four per cent of the Indians of Arizona are said to have trachoma. The disease has been nearly eradicated from the schools of Douglas.

Dr. J. W. Thompson, late interne at the Wills Eye Hospital, Philadelphia, and the West Penn Hospital, Pittsburg, is associated with his brother, Dr. H. M. Thompson, in Pueblo, Colo.

Dr. F. Park Lewis of Buffalo addressed the Physicians' Civic Club of Baltimore on February 11 on the subject of the commission form of government in Buffalo.

The Kansas City Eye, Nose and Throat Society gave a smoker on January 13 at which 50 physicians of that city and neighboring cities were present.

Dr. Henrietta M. Farquharson of Chicago is recovering from severe injuries caused by being knocked down by a wagon while crossing a crowded street.

The Illinois State Medical Society meets in Champaign, May 16, 17 and 18. Special operative clinics, as well as a scientific program, are arranged for the Eye, Ear, Nose and Throat Section under the presidency of Dr. Joseph Beck of Chicago.

Dr. L. D. Green of San Francisco, who has been with Col. Henry Smith in Amritsar, India, during the latter part of 1915, has returned home.

At the annual meeting of the Milwaukee Oto-Ophthalmic Society, held January 19, the following officers were elected: President, Dr. Gustavus I. Hoague; vice-president, Dr. John S. Barnes; secretary-treasurer, Dr. Claude S. Beebe.

The large number of blind soldiers in France gives rise to discussion as to the best form of print for their use. Raised lines conforming to the lines of ordinary letters have been suggested, but the advantage of the more sharply defined characters in the point system seems to outweigh newer methods.

The Chicago Ophthalmological Society held its annual meeting and banquet on January 17. Dr. L. Webster Fox of Philadelphia was the guest of honor and held an operative clinic at the Illinois Charitable Eye and Ear Infirmary in addition to delivering the annual address on the subject of operations upon the eyeball in connection with the findings of pyorrhoea alveolaris. The following officers were elected for the ensuing year: President, Dr. William E. Gamble; vice-president, Dr. Francis Lane; secretary-treasurer, Dr. Paul Guilford (re-elected); councillor, Dr. J. Sheldon Clark.

The following deaths of American ophthalmologists are announced:

- Dr. Michael F. Patterson, of Des Moines, aged 58.
- Dr. Benjamin L. Millikin, of Cleveland, aged 64.
- Dr. Eric S. Wischart, of Snow Hill, Md., aged 28.
- Dr. Ephraim S. Evans, of Columbus, aged 76.
- Dr. Melvin E. de Groat, of Alva, Okla., aged 51.
- Dr. Henry Eastman, of Pittsburg, aged 45.
- Dr. Henry M. Jewett, of Providence, aged 56.
- Dr. Charles S. Crane, of Grand Forks, S. D., aged 53.
- Dr. Alexander G. Sinclair of Memphis, aged 73.
- Dr. Eugene W. Beebe of Milwaukee, aged 75.
- Dr. George Suttie of Detroit, aged 63.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.) (Carl Wagner (E.E.N.T.))	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.) A. G. Wippert (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.) (Carl Wagner (E.E.N.T.))	G. W. Mahoney (Poli.) Richard S. Pattillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wippert (E.E.N.T.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippert (E.E.N.T.)
10 A.M.	Brown Pussey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A.M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. R. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. R. Eiss (Inf.) E. R. Cressley (Inf.) *T. A. Woodruff (St. Luke's) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) *Frank Alport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. R. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) Oliver Tydings E. N. T.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	I. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) E. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

ABBREVIATIONS:

*Special operative eye clinic.	County: Cook County Hospital, W. Harrison and Monroe Streets. Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets, M. H.; Mercy Hospital.	Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue. P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street. N. W. U.: Northwestern University, 2431 Dearborn Street.	Rush: Rush Medical College, W. Harrison and Wood Streets. St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue. U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.
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C. C. S.: Chicago Clinical School,
1844 W. Harrison Street.
E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

THE OPHTHALMIC RECORD

A MONTHLY REVIEW OF THE PROGRESS
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No. 4, New Series

THE FUNDAMENTALS OF ACHROMATISM.

BY

CHARLES F. PRENTICE, M. E.

NEW YORK.

Author's note.—Publication of this article in an ophthalmic journal is warranted through the following statement being made in May's Manual of the Diseases of the Eye, 5th Edition, 1908:

"The invisible bifocal lens is constructed of two, or of one lens upon which the reading portion is fused. The increased strength of the smaller lens depends upon the higher refractive index of flint glass of which it is made. These lenses are very neat and are achromatic, but expensive."—Page 312.

The subscribed demonstration proves that such lenses are really constructed in direct violation of the conditions necessary to produce achromatism, and are, therefore, *not achromatic*. In fact, in some powers they actually increase the phenomenon of color to a more or less appreciable degree.

This novel description of achromatism is also prefaced by a brief history of the involved phenomenon of dispersion, abstracted chiefly from Prof. Southall's Principles of Geometrical Optics, and constitutes one of the chapters of the author's essay on Ophthalmic Lenses and Prisms, soon to appear in the *American Encyclopedia of Ophthalmology*.

Dispersion.

In the year 1672 Sir Isaac Newton communicated to the Royal Society his discovery that refraction by a prism resolves white light into its component elementary color-rays to produce the solar spectrum, and that these dispersed rays of different wave-lengths may be again refracted by a suitably placed duplicate prism to produce white light. Although Newton thus laid the foundation for achromatism (freedom from color), and incidentally also substantiated the law that light of any wave-length is propagated either forward or backward over the same rectilinear course, he was nevertheless of the opinion that the color-deviation could not be corrected in a prism or lens without annulment of the ray-deviation. Seventy-five years later Euler,

who had based his argument upon the erroneous assumption that the human eye is an achromatic combination of lenses, mathematically demonstrated that achromatism is achievable. Ten years thereafter Dolland, though having failed to experimentally verify Euler's calculations, yet encouraged by the example of Klingenstierna's experiments, successfully produced an achromatic telescope-objective in which a convex lens of crown-glass was combined with a concave lens of flint-glass; the chromatic dispersion of the former being counteracted by the latter through an equal amount of chromatic dispersion in the opposite direction.

Newton had concluded that sun-light is not homogeneous, but is composed of rays of different colors, some of which are more refrangible than others; the red rays being refracted least, and the violet rays most, in the spectrum whose colors are arranged in the order of red, orange, yellow, green, blue, indigo and violet. Moreover, he supposed the solar spectrum to be continuous with respect to the gradual transmutation of its colors. However, Wollaston, in 1802, discovered that the solar spectrum is crossed by a number of dark bands, which were later explained by Kirchhoff to be due to the light-waves from each incandescent element within the nucleus of the sun being absorbed by its own cooler gas within the sun's vaporous envelope. In fact, the absence of any particular color or light-wave in the solar spectrum, as exhibited by the presence of these bands, indicates that the corresponding wave is either not emitted by the sun, or else that it is lost through absorption or otherwise before it reaches the observer's eye.

After all, it was not until Fraunhofer, in 1814, independently rediscovered these bands as lines irregularly distributed over the entire extent of the solar spectrum, and that only their relative distances apart and their associated color-areas are altered in the same sequence by using a prism of different material, that their true significance and value were recognized by him. As Fraunhofer found each of these lines, at that time 576 in number, to correspond to a definite wave-length of light, he employed them to determine the different refractive indices of a substance, and designated the more conspicuous lines in the different parts of the spectrum by the capital letters of the Roman alphabet from A to H; the line in the violet end of the spectrum, as nearly as he could locate it, being designated by the letter, J. Therefore, it is obvious that the so-called refrac-

tive index of a substance is ambiguous, unless the particular line of the spectrum for which the refractive index has been determined is specified, since a medium has just as many indices of refraction as there are lines in the different color-areas of the spectrum. Hence the line, D, located in the brightest yellow part of the spectrum, is commonly used to determine the refractive indices of the various kinds of glass, so that the refractive index for this line, indicated by n_D , identifies the so-called *mean ray*, situated about midway between the lines, C and F, in their respective red and blue parts of the spectrum. As the interval between these lines defines the chosen extent of the dispersions of two media that may become subjects of comparison, the difference between them, $n_F - n_C$, called the *mean dispersion*, serves for all practical purposes to sufficiently characterize the dispersions of different substances; and the ratio of this value to the difference, $n_D - 1$ (the index for the line, D, less the index of air, whose value is 1), provides an appropriate expression for the so-called *relative dispersion* or

dispersive power,* $\frac{n_F - n_C}{n_D - 1}$, of a substance. This value, when applied to a definite material, such as crown-glass, may be written, $\frac{n_F' - n_C'}{n_D' - 1}$, so as to distinguish it from the corresponding value, $\frac{n_F'' - n_C''}{n_D'' - 1}$, for flint-glass.

Achromatism, as will be later shown, depends (1) upon the joining together of at least two kinds of glass of different refractive powers and unequal dispersions, as identified by the lines of the spectrum, and (2) upon a definite choice of the inclination of their contiguous surfaces to their exposed bounding surfaces, since the latter are usually prescribed. Although Fraunhofer and others had tried to produce new kinds of glass, it was not until Abbe and Schott, of Jena, Germany, succeeded in making a variety of pairs of different kinds of crown-glass and flint-glass, in which the dispersion in the various parts of the spectrum is as nearly as possible proportional in each pair,

*The reciprocal of this value, which is $\frac{n_D - 1}{n_F - n_C}$, is designated by v , and the differences between the refractive indices of n_D , or n_F and the indices for other spectral lines are given under "Partial Dispersions" in the stock—and price—lists of Jena glass.

that it has been possible to take the fullest advantage of Fraunhofer's discovery. Encouraged by these experiments, Schott and Gen., in 1866, established the "Glasstechnisches Laboratorium" at Jena, where the world renowned Jena Glass is produced to supply skilled opticians with glass having the properties necessary to fulfil, as closely as possible, the theoretic requirements in perfected optical instruments.

Achromatism.

In order to explain the principle of achromatism, license is here taken to depart from the usual method, by substituting an original, analytic and more or less elementary one, in which, for the sake of greater clearness in the accompanying drawings, the delineations of dispersion are greatly exaggerated.

Moreover, the Fraunhofer D-line in the brightest yellow part of the spectrum is chosen for the refracted mean ray (Y),

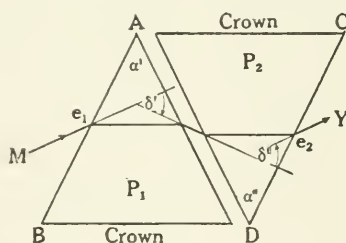


Fig. 1.

about midway between the red (R) and blue (B) rays; wherefore, this demonstration, also strictly applies only to the behavior of the color-rays confined between these limitations of the spectrum, commonly designated by the Fraunhofer lines C and F, respectively, for incident white light proceeding from infinity. As the indigo and violet rays, though necessarily constituent parts of white light, are thus ignored, it is to be understood that wherever emergent white light is later mentioned it is supposed to be only approximately colorless.

In geometric optics the laws of refraction are ordinarily applied to white light as if it were homogeneous or monochromatic and traversed successive media as though each medium had only one index of refraction, usually the index, n_D , corresponding to the D-line of the spectrum.

Thus, for instance, when the axes (mean rays) of the incident (M) and emergent (W) beams are inclined at equal

angles to the surfaces of a prism, P_1 , in Fig. 1, the prism is said to be in position to produce the "minimum deviation" of the emergent beam, $\delta' = (n'_D - 1) \alpha'$, I. regardless of the fact that it is composed of a number of constituent color-rays. Therefore, strictly speaking the prism can not be placed in position of minimum deviation for all color-rays at the same time, but for limited extents of dispersion, such as between the red and blue rays inclined at slight angles to the surfaces of a prism of very small angle, it may be considered to be very nearly so.

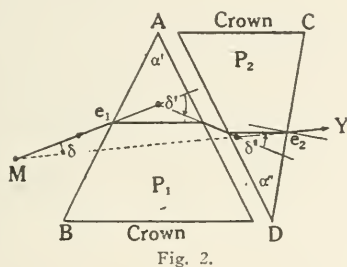


Fig. 2.

Since achromatism involves the deviations as well as the dispersions produced by at least two media of different optical densities, only the deviation of a monochromatic ray, the mean yellow ray, will first be considered with reference to two adjacent prisms, P_1 and P_2 , Fig. 1, of the same crown-glass. In

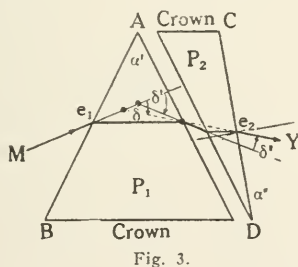


Fig. 3.

the same refracting angle, $\alpha' = \alpha''$. As these equal deviations occur in opposite directions, there is not any actual deviation from the direction of the incident ray, M , so that the emergent ray, Y , is parallel to it, and the prisms jointly act as a plate, even though their faces are not in contact.

this case the incident mean ray, M , to the prism, P_1 , suffers the minimum deviation, δ' in its progress toward the second prism, P_2 , where it again suffers the minimum deviation, $\delta'' = \delta'$, in its passage through the second prism, since both prisms have

However, deviation from the direction of incidence may be secured through changing the inclination of the posterior surface of the second prism; in other words, through decreasing its refracting angle, a'' , as shown in Fig. 2, where the emergent ray, Y, has a lesser upward direction than in Fig. 1. In Fig. 3 the angle, a'' , is even still smaller, and therefore produces a downward direction of the emergent ray Y.

It is obvious that these changes in the direction of the emergent ray, Y, depend upon whether the refracted ray within the second prism approaches the point, e_2 , of emergence from below or from above the perpendicular at this point of the surface, CD, as shown in figures 2 and 3; this also being true of the same mean ray, if considered as the axis of the dispersed color-rays, when the incident light is a beam of white light. In any event, the resultant deviation is $\delta' - \delta'' = \delta$; this being the same deviation as would be produced by a single prism whose angle between the faces, AB and CD, is $a = a' - a''$.

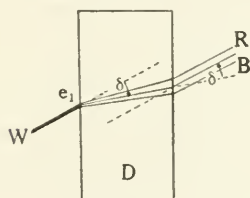


Fig. 4.

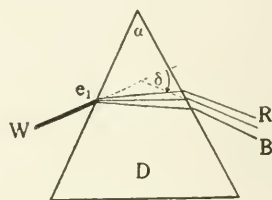


Fig. 5.

However, in associating deviation with dispersion it is necessary to consider also the individual directions of the color-rays.

Thus, for instance, in the figures 4 and 5, representing the principal sections of a plate and a prism, respectively, the narrow beam of white light, W, incident at e_1 , upon the denser medium, D, is refracted by it so as to produce a slightly wider beam composed of emergent color-rays between red (R) and blue (B). However, to render this color-effect at the margins of the light emergent from a *plate* at all visible, even through a carefully adjusted narrow opening, the plate would require to be very thick, and the incident light would also have to pass through a very narrow slit; but, under normal conditions of exposure, the incident light may be thought to consist of an infinite number of contiguous beams, W, whose constituent and emergent parallel color-rays so overlap each other as to be per-

ceived by the eye as white light. Still, in each of the indicated media the color-rays are divergent at e_1 , when the light is propagated from left to right, but, in accordance with the law of reversibility, when the color-rays between R and B are propagated in the opposite direction, they internally converge toward e_1 , and there produce emergent white light. Hence, in either case, white light is manifest whenever its constituent color-rays are at least parallel; whereas, an actual existence of color is confined to the absence of such parallelism after refraction.

To the degree of approximation previously stated, the prism, Fig. 6, is placed in position of minimum deviation, so that the angular deviation of the refracted blue ray, B, from the direction of incidence is $\delta'_B = (n'_B - 1) \alpha'$. Similarly, for the red ray, R, the deviation is $\delta'_R = (n'_R - 1) \alpha'$.

When α' is herein substituted by $\frac{\delta'}{n'_D - 1}$, from the equation I, the angular difference between the blue and red rays is

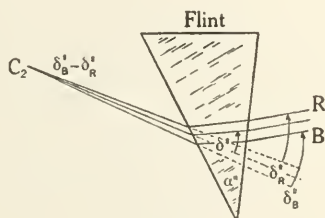
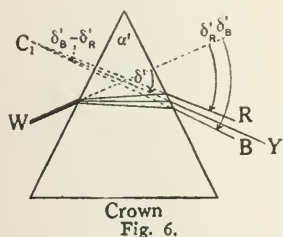


Fig. 7.

$$\delta'_B - \delta'_R = \frac{n'_B - 1}{n'_D - 1} \delta' - \frac{n'_R - 1}{n'_D - 1} \delta' = \frac{n'_B - n'_R}{n'_D - 1} \delta',$$

or, the angle of dispersion, $\delta'_B - \delta'_R$, is equal to the dispersive power $\frac{n'_B - n'_R}{n'_D - 1}$ multiplied by the angular deviation, δ' , of the refracted mean ray, Y. Therefore, not only is deviation and dispersion produced, but experience also teaches that different substances produce different dispersions. For instance, flint-glass has a greater dispersive power than crown-glass, so that an inverted flint prism may be found to produce the same, though oppositely directed, dispersion as a crown prism of greater angle. This is made clear through the reversed arrows ascribed to the rays emerging from the flint prism, of lesser angle, Fig. 7, which also shows the angular dispersion, $\delta''_B - \delta''_R$, for the color-rays *diverging* from C_2 in their incidence from the

left, since the refracted parallel rays, R and B, if propagated from the opposite direction, actually incur the same dispersions, δ''_R and δ''_B , respectively.

Therefore, it is obvious that two prisms having different angles of deviation, δ' and δ'' , respectively for crown and for flint-glass, yet producing the same angles of dispersion, $\delta'_B - \delta'_R = \delta''_B - \delta''_R$, may be combined with their bases reversed so as to insure the emergent color-rays being made parallel to constitute white light, and that the choice of their refracting angles will require to be such that, the divergent color-rays, emergent from the crown-glass prism, shall be those rays, incident to the flint-glass prism, which appear also to proceed from the common point C_1 , the vertex of the coincident equal angles of dispersion in Fig. 8 and Fig. 9.

Since this principle also applies when the space between the parallel faces of the prisms is eliminated, it is usual to join them together by means of Canada balsam, thus creating a com-

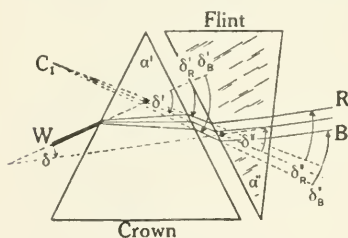


Fig. 8.

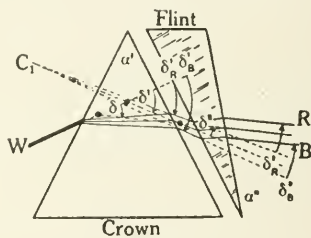


Fig. 9.

posite prism which is said to be achromatic only for the two colors, red and blue. As the direction of each color-ray depends upon its own refractive index for each different medium, it follows that the angle of dispersion, $\delta'_B - \delta'_R = (n'_B - n'_R) a'$, for the crown-prism, and similarly, $\delta''_B - \delta''_R = (n''_B - n''_R) a''$, for the flint-prism.

Moreover, as these angles of dispersion must be equal to insure achromatism for the red and blue rays, it follows that:

$$(n'_B - n'_R) a' = (n''_B - n''_R) a'', \dots\dots\dots \text{II.}$$

which determines the angles a' and a'' of the superposed prisms, in order that the emergent light shall be approximately free from color.

The deviation of the emergent light from the direction of incidence is equal to $\delta' - \delta'' = (n'_D - 1) a' - (n''_D - 1) a''$.

Thus, by making $\delta' = \delta''$, the angles of two prisms of different substances may also be so chosen as to avoid deviation

of the refracted mean ray, while still permitting the dispersion of all other color-rays, and as required in the construction of direct vision spectroscopes.

Incidentally it is to be noted that, the position of minimum deviation is not also the position of minimum dispersion, since the dispersion may be indefinitely increased by adjusting the prism with respect to the incident beam. Therefore, it is always possible to adjust the refracting angles, α' and α'' , of two contiguous prisms of different glass so that the dispersion for two colors produced by the first prism may be sufficiently counteracted by the second prism to effect approximate freedom from color in the emergent beam. In this case, the residual dispersion, called the *secondary spectrum*, is due to the fact that different substances disperse corresponding parts of the spectrum to widely different extents. For instance, one medium may separate the blue and the orange light very much, while the other medium separates these colors very little, so that the areas of color in both spectra are not precisely alike. This so-called *irrationality of dispersion* prevents reliable comparisons of the spectra of prisms being made, since the spectrum obtained with one prism is not the same as that produced by another. Besides, the projected spectrum produced by a prism is impure, because each point in the spectrum is not illuminated exclusively by one of the constituent colors of white light, so that there is more or less overlapping of them. However, if the virtual spectrum is viewed through a prism in position for minimum deviation, there is not any sensible overlapping of this kind, hence the *virtual spectrum* is pure. On the other hand, spectra which are produced by *reflection* from ruled gratings are all pure and exactly alike, so that the data secured by different observers are always the same, and for which reason the diffraction spectrum is chosen as the standard in the physical laboratory.

However, reverting to the *refracted spectrum*, it is possible in an achromatic combination of two prisms to correct its successive residual colors through adding another prism for each color. When three prisms are used to correct three colors the remaining smaller dispersion is called the *tertiary spectrum*. Therefore, it is impossible to obtain perfect achromatism without the use of a very large number of different media, but, as the successive uncorrected spectra rapidly grow fainter they are

negligible. Hence it is seldom deemed necessary to correct more than two colors.

The preceding principles are also well adapted to explain achromatism of a lens, especially when the component lens-thicknesses are exaggerated for the purpose only of lucid illustration.

With this understanding, all parallel rays of white light incident from the left upon the convex lens, Fig. 10, result in divergent pencils of color-rays within the lens, which upon

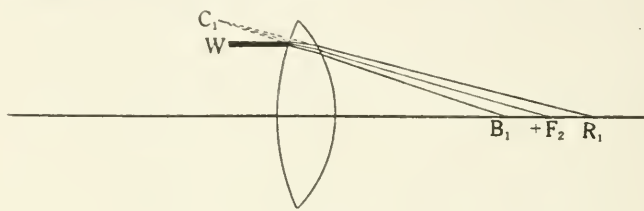


Fig. 10.

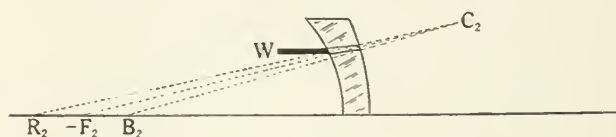


Fig. 11.

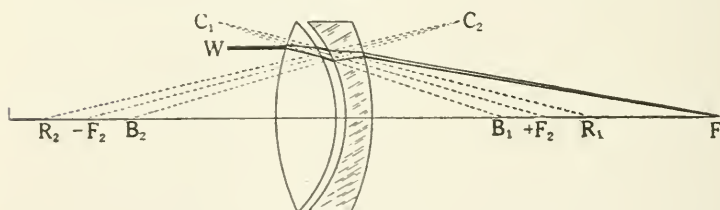


Fig. 12.

emergence intersect the optic axis at different points, so that the red and blue rays are separately focused at R_1 and B_1 , respectively. In other words, the convex lens is more strongly convergent toward the axis for blue rays than for red rays, or the emergent light is a divergent pencil of color-rays appearing to proceed from C_1 ; whereas, the weaker concave lens, Fig. 11, is more strongly divergent for blue rays than for red rays, so that the emergent light is a convergent pencil of color-rays whose vertex is C_2 . Now, as the dispersion of flint-glass is greater than that of crown-glass, it is obvious that the same amount of dispersion, though in the opposite direction, may be produced through choice of a weaker concave flint lens whose

focal length is, therefore, greater than that of the convex crown lens.

Hence, when two such properly proportioned lenses, Fig. 12, are very slightly separated upon a common axis, their *equal dispersions* in opposite directions counteract each other, thus producing an achromatic combination corrected for two colors. However, in this case the rays emitted from the convex lens are *incident* upon the concave lens as a divergent pencil of color-rays which individually converge toward R_1 and B_1 upon the axis, so that the divergent color-rays from the convex lens, which appear to proceed from C_1 are no longer, after refraction by the concave lens, directed to the point C_2 but assume a lesser convergence toward the more remote point, F , the focus of the combination. Therefore, in order to make a lens approximately achromatic for parallel incident rays it is necessary that it shall be so constructed as to affect a fusion of the points B_1 and R_1 of the convex lens into a single point, F , the positive focus of the combination. This means that the emergent color-rays are not parallel, and, therefore, do not constitute white light until they have collectively merged into the focal point, F , where they are supposed to produce it; whereas, with two prisms the emergent light is achromatised through immediate parallelism of the color-rays at the surface of emergence, and in front of which a continued divergence of the internal color-rays has been shown to exist. On the other hand, in a combination of two contrageneric lenses continued divergence of the color-rays within both lenses does not exist, since their divergence within the crown lens is approximately counteracted by their convergence within the adjoining flint lens, Fig. 12. Consequently, it is evident that white light does not traverse the interior of a refracting medium, even if it is achromatic. Since the convex crown lens has a shorter focal length, it dominates the refractive power; whereas, the weaker concave flint lens prevails only as the color-correcting element in the combination, which in practice is made integral through Canada balsam, in order to avoid reflection from the contiguous surfaces.

Moreover, as the angles of dispersion are proportionate to their corresponding relative dispersions and may be expressed through them, it is also obvious that the relative dispersion of the convex *crown* lens must bear the same proportion to its mean focal length, $+f'$, as the relative dispersion of the con-

cave flint lens to its mean focal length, $-f''$; that is to say,

$$\frac{n'_F - n'_C}{n'_D - 1} : f' = \frac{n''_F - n''_C}{n''_D - 1} : -f''.$$

This equation, when transformed to

$$\frac{n'_F - n'_C}{n'_D - 1} \frac{1}{f'} + \frac{n''_F - n''_C}{n''_D - 1} \frac{1}{f''} = 0, \dots\dots\dots \text{III.}$$

prescribes the condition of achromatism of two superposed contrageneric thin lenses made of crown-glass and flint-glass, and involves the stipulation that the sum of the products of the relative dispersions of the substances used and the refractive powers of the lenses shall be zero.

As n'_F is greater than n'_C , and n''_F is greater than n''_C , while n'_D and n''_D are both greater than unity, it follows that f' and f'' must have opposite signs, so that, if the combination is to be a positive or convergent lens, the component convex lens, whose focal length is f' , will require to be stronger than the concave lens whose greater focal length is $-f''$; wherefore, the relative dispersion of the convex material will have to be less than that of the concave material, in order to satisfy the equation III. This equation also applies to a *concave* achromatic lens, but in which the stronger concave element is made of crown-glass and the other of flint-glass.

However, as the achromatic combination under discussion is convex, its refraction is $1/f$, while the refractions of its component convex and concave lenses are $1/f'$ and $-1/f''$, respectively, so that,

$$\frac{1}{f'} - \frac{1}{f''} = \frac{1}{f},$$

from the general formula, $\frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{f}$ IV.

Therefore, so long as the focal distances, f' and f'' , which satisfy this equation, are also so proportioned to each other as to satisfy the equation, III, the convex lens will be achromatic with respect to the two colors, red and blue.

The exposed surface-curvatures of a lens of any form, whose focal length is f , are determined by the general formula,

$$\frac{1}{f} = (n_D - 1) \left(\frac{1}{r_1} - \frac{1}{r_2} \right), \dots\dots\dots \text{V.}$$

so that even the achromatic lens may be of any type commen-

surate with the more or less impiric choice of the radii, r_1 and r_2 , if it is to satisfy only the condition of achromatism for paraxial rays. But, as the image-distortion due to spheric aberration is nearly as pernicious as chromatic aberration, the former must also be corrected, especially in lenses of wide aperture.

A lens in which both the chromatic and spheric aberrations are corrected is called an *aplanatic lens*, yet its construction also involves compliance with the so-called Sine Condition.* However, ordinarily the radii, r_1 and r_2 , of the outer surfaces of an achromatic lens are selected so as to give the lens that form which produces the least spheric aberration. In order to simplify the cumbersome calculations necessary to provide the requirements to avoid both kinds of aberration in thin lenses, Herschel, in 1821, established a simple rule which, with sufficient practical accuracy, applies to lenses of no greater aperture than $1\frac{1}{2}$ inches. Professor Prechtl of Vienna, in 1828, stated it as follows:

"An object-glass consisting of two thin lenses is practically free from aberration when the radius of the exposed surface of the crown-glass = 6.72 and that of the flint-glass = 14.2, provided the mean focal length, f , of the objective is made = 10, and the radii of the two contiguous inner surfaces are so calculated that the focal lengths of the component lenses are in proportion to their dispersive powers." However, this applies only in case the crown-glass index is 1.528 and the flint-glass index is 1.601, when it is merely necessary to make the radius of the exposed surface of the crown-glass, $r_1 = 0.672 \times f$, and the radius of the exposed surface of the flint-glass, $r_2 = 14.2 \times f$, in order, through the formula, V, to determine the radii of the contiguous surfaces of the lenses whose focal lengths, f' and f'' , must be made to satisfy the equations, III and IV, for an achromatic lens whose focal length is f . Moreover, even though Herschel's rule to obviate spheric aberration is not complied with, the formulæ, III, IV and V, provide for at least approximate achromatism of a lens of any form for which at least one radius of surface-curvature and the focal length are known. However, when achromatic lenses are required to be of wide aperture, it is necessary to use formulæ of a higher order of approximation.

*Principles of Geometrical Optics.—Southall.

Through superposing the diagrams illustrating spheric and chromatic aberration, to produce the Fig. 13, the distinction between the achromatic and the aplanatic lens may be lucidly shown, since all of the color-rays of the simple lens that intersect the optic axis, between V_1 and R_1 , are made to merge into the focal point, M , by the achromatic lens, which, if also aplanatic, eliminates both the longitudinal spheric aberration, $L M$, and the chromatic aberration, $V_1 R_1$.

Incidentally it is also to be noted that the detrimental effect of chromatic aberration is greater than that of the spheric aberration, because the circle of chromatic aberration, ab , is considerably greater than the least circle of spheric aberration, cd .

However, as in the latter the light intensity is correspondingly greater, its effect is not to be estimated by the proportions

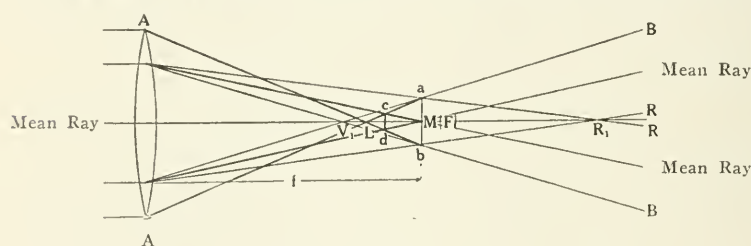


Fig. 13.

Least Circle of Spheric Aberration, cd .
Circle of Chromatic Aberration, ab , in Focal Plane.

of these circles of aberration to each other. The diagram makes it apparent that the *longitudinal chromatic aberration*, $V_1 R_1$, will increase for a greater focal length, f , of a lens made of the same kind of glass, and that it does not depend upon the aperture of the lens, but that it will remain the same constant for different apertures of a lens having the same focal length. Therefore, it is the reverse of the condition that applies to the *longitudinal spheric aberration*, $L M$, which increases with the square of the aperture, AA , and in inverse proportion to the focal distance. On the other hand, the *lateral chromatic aberration*, measured by the diameter, ab , of the circle of chromatic aberration, depends upon the diameter of the aperture of the lens, and is proportional to it, as may be seen in the diagram. Therefore, in an achromatic convex lens it is evident that the weaker concave lens must supply a circle of chromatic aberration of the same size as that produced by the stronger

convex lens; wherefore, the dispersive power of the concave lens must be greater in proportion to its refractive power, and for which reason, as previously shown, flint-glass having a greater dispersive power is used. Moreover, the greater the dispersive power of the flint-glass is in proportion to that of the crown-glass, and the smaller the difference between their respective dispersions, the flatter the curvature of the concave lens will require to be, and therefore also the greater will be the preponderance of the refraction of the convex crown lens over that of the concave flint lens.

PASTEURIZATION IN THE TREATMENT OF CORNEAL ULCERS.*

BY

A. E. PRINCE, B. S., M. D., Ph. D.

SPRINGFIELD, ILL.

Two years ago, I filed away a report of a method of treating corneal ulcers, published in the *Archives d'Ophthalmologie*, by L. Meekers of the University of Liege.

The title of the article was Thermo-therapy of Progressive Ulcers of the Cornea. It related to the application of heat by



Fig. 1. Extent of Ulcer of Father Ryan.

holding the heated end of a galvano-cautery electrode close to the surface of the ulcer without touching it, and accomplishing the sterilization of the ulcer by means of the heat that radiated from the point. To this method of treatment he gave the name "Chaufrage" as opposed to cauterization. I tried this method in a few cases at the time, but was not especially pleased with it, and I have never seen it referred to or used since. However, the impression made on my mind was sufficient in the following crisis, to awaken a dormant memory, and lead to a practical application of the principle involved, which may prove to be of inestimable value because it is so simple that it may be made

*Read before the Sangamon County Medical Society.

Note: The cuts are diagramatic.

available by the general practitioner of the small town, as well as the oculist of the large city.

On November 10th I was called to see a prominent priest, who was suffering from a serpigenous ulcer, which had progressed until it extended half way round the circumference of the cornea. His oculist had used heat, cold, atropine, argyrol, tannic acid, and he continued to suffer. The ulcer was excavated down to the membrane of Descemet, and the cornea was assuming a hazy appearance, which often precedes a general slough.

It was apparent to my mind that something radical had to be done at once. There was no time to get a culture, and it was my belief that the application of the cautery would cause an immediate perforation which would be followed by an incarceration of the iris, and other complications ultimately resulting in blindness.

I secured a 1 per cent solution of ethyl-hydro-cuprein, which is said by Gradle to be a specific for the pneumococcus, but without waiting to determine the results of this, I heated a copper ball which I had made for another purpose, and held it close to the extremity of the ulcer until it cooled. This was repeated five times at different points in the length of the ulcer, and he was given a $\frac{1}{2}$ per cent solution of phenol to drop into the eye every hour. On the following morning, I found that he had rested well, the pain had abated, and the appearance of the ulcer had changed for the better. This treatment was repeated twice a day for three days, at the expiration of which the excavation in the cornea had filled with exudate, and the germs had lost the battle. The recovery was complete; the center of the cornea was not affected, and he developed 20/20 vision.

The idea underlying this method of employing heat is based on the well known fact that the heat required to destroy the germs which are responsible for ulcers of the cornea is less than that at which the physiological cells of the cornea would be injured.

The pneumococcus is sterilized in ten minutes at 132° F.

The Morax-Axenfeld bacillus is killed in five minutes at 131° F.

Pneumococcus is sterilized instantly at 149° F.

In the sterilization of milk, it is exposed for thirty minutes at 142° F.

Albumin of egg coagulates at 160° F.

It is found in practice that it is not necessary to absolutely destroy all the germs in a given case, for the exposure of the germs lowers their vitality, and renders them innocuous at the same time it gives the phagocytes a chance.

Antibodies surround the ulcer with a resisting wall of exudate, and establish new circulation against which the diminished activity of a reduced number of germs is powerless.

The writer lays no claim to originality except in the manner of method. Bibliography credits Burgeois (*Annals d'Oculistique*, 1899) with using heat in the treatment of serpiginous ulcers by means of hot air, and Wesley (*Bericht. d. Oph. Gesellschaft.*, Heidelberg, 1912) by directing steam from a small tube onto the ulcer.



Fig. 2. Prince Pasteurizer.

Either of these methods is tedious and available to but a small number of those who might possess themselves of a special apparatus. I am impressed, by the following experiences, that we have a remedy which will effectually stop the progress of an ulcer before it advances over the pupillary area, and does permanent injury to the sight; and with an outlay of but a pittance. With this end in view, I have asked F. A. Hardy & Co. to supply a "Pasteurizer" in the shape of an elongated egg mounted on a handle, which can be sold for about two dollars.

Application.

The end of the instrument is held in the flame of the gas or the alcohol lamp until it is red-hot; the lids are separated by the first and second fingers, and the patient directed to look so as to bring the cocainized (by one drop of a four per cent solution) ulcer into the middle of the palpebral aperture. The heated ball is held about three-sixteenths of an inch from the ulcer until it cools. The amount of heat can be appreciated by the fingers of the operator, and the ball may be made to approach the cornea as the heat diminishes. To acquire familiarity with the amount of heat which actually reaches the cornea, it is well to approximate the heated end to the bulb of an ordinary thermometer. The temperature should not register more than 150°.

Results.

The results are found to be better than those following the application of the cautery for the reason that no additional tissue is destroyed. It is also found that the resulting scar is less opaque. Pus in the anterior chamber usually absorbs without perforation, or the necessity of performing a paracentesis.



Fig. 3.

The cornea at the margin of the ulcer remains clear, and shows no tendency to become hazy, due to the extension of the pathogenic microbes between the layers of the cornea, and along the lacunar circulation.

Cases.

The following are a few abbreviated cases which will give an idea of the behavior of various kinds of ulcers and infected wounds of the cornea.

Case 2. Fig. 3.

Mr. Elmer Brooks, Lincoln, Ill., 30 years of age. Referred by Dr. Coleman. Ulcer at location of 4 o'clock, 3 mm. in diameter; duration one week.

He had been treated at his home for several days, and was sent by his physician on account of the fact that he had made no progress. He had pain and photophobia and voluntary ptosis. The ulcer was superficial, and not especially dangerous.



Fig. 4.

I pasteurized the eye, and gave him a solution of boric acid and sent him home to report on the following day. When he returned, there was no irritation, and he was pasteurized again and discharged. He has had no return of trouble.

Case 2. Fig. 4

Miss S. Chenery, Springfield, Ill., 75 years of age. Central

corneal ulcer with hypopion. Eyesight lost by cyclitis, following a needling operation for cataract many years ago.

I was called to treat the above case, and I decided that it was a case that would most likely lead to evisceration or enucleation in a very few days. This was particularly likely, since the eye was quite hard from a chronic glaucoma, which had



Fig. 5.

not given her much pain, in consequence of which nothing had been done to relieve it.

To test out the merits of the new method of treatment, I pasteurized the eye twice a day, and was delighted to see that on the second day the hypopion had materially diminished. On the third day it was less, and on the fourth day it had disappeared. The ulcer, which was about 3 mm. in diameter, made no progress, and after three days began to reduce in size, and on the eighth day she was discharged. A small facet was all that remained to mark the spot of the ulcer.

After four months there has been no return of trouble.

Case 4. Fig. 5.

Mr. Sallee, Tuscola, Ill., 35 years of age.

The worst type of serpiginous ulcer, on the nasal side, extending one-third around the cornea, a round ulcer on the temporal side 4 mm. in diameter, a narrow streak extending

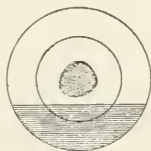


Fig. 6.

from this across the upper border of the cornea, and two recent punctate infections at 1 and 1:30. He had been under the care of his family physician for conjunctivitis for several weeks, and about a week before coming to me he developed the ulceration, which rapidly extended, and at the time of his arrival he presented the appearance above outlined, with a threatening

slough of the entire cornea. Under cautery or medical treatment, I would formerly have regarded the case as exceedingly hazardous. This case produced a curious psychological impression on me. I said to myself, "It is a large load, but I am strong enough to lift it, and it is no more to me than a feather." I pasteurized the ulcers twice on the day of his arrival, and the nurse repeated the treatment twice on the second day (on which I was absent), and on the third day the eye was absolutely safe, and he was sent home with a 1 per cent solution of glycerole of tannin. The pupillary area was not involved, and his vision will not be impaired.

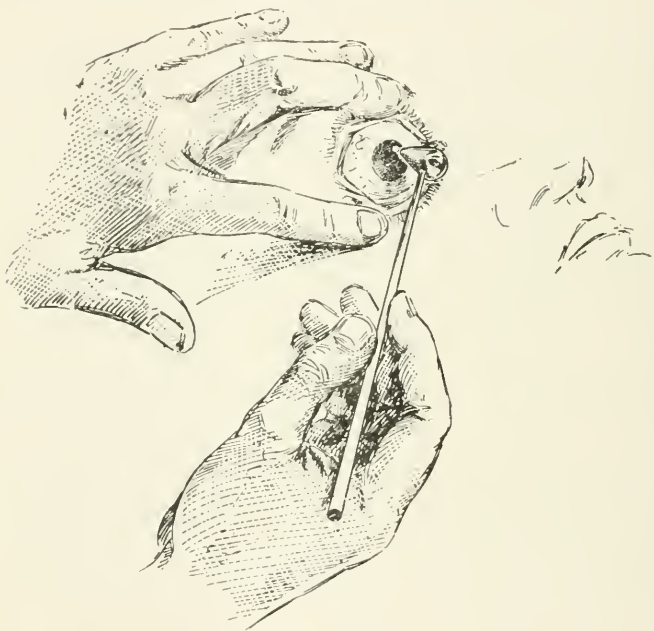


Fig. 7.
Cut showing application.

Case 5. Fig. 6.

Mr. Henry Stechmann, coal miner, Virden, Ill., 48 years of age.

Central hypopion ulcer from injury by being struck in the eye by a small piece of coal. The center of the cornea had sloughed, and the membrane of Descemet bulged into the wound. It was a type of ulcer which I have always dreaded, for so many of them present the necrotic character which leads to the destruction of the eye. There being nothing to save by delay, I pasteurized the ulcer, and I immediately thereafter

made a paracentesis through the floor of the ulcer, and let out the pus. He was obliged to return home on account of his son's funeral, which prevented my seeing him for two days, at the end of which the cornea was clear about the edge of the ulcer, which had closed by coagulated aqueous humor. The nurse pasteurized the ulcer on two subsequent occasions, which



Fig. 8.

was probably unnecessary. He will have a scar over the pupil, but excellent vision may be obtained by an iridectomy.

Fig. 7.

Case 6. Fig. 8.

Mrs. Thomas Supan, Arthur, Ill., 22 years of age.

Infected, lacerated wound of the cornea; traumatic cataract; anterior chamber filled with pus; painful iritis. A white exudate extended to the lens. This would ordinarily have been a case for evisceration. I decided to give this case a severe test, feeling that the arrest of the inflammatory process of this apparently hopeless case would give me the greatest degree of confidence in the treatment by pasteurization.

The heated ball was held close to the eye, and reheated twice, and the treatment repeated twice a day. The purpose was to heat the aqueous humor, and make it carry the heat to



Fig. 9.

the germs inside of the cornea. I had no precedent for doing this, and was prepared not to be disappointed if the result was not all that might be hoped for, but to my gratification the eye responded to the treatment, and the pain rapidly abated, and the edges of the wound took on a healthy appearance, and the pus was absorbed so that at the end of a week the eye was regarded safe. She returned home with instructions to report

after two weeks, and later, if the conditions warranted, I would remove the cataract. When she returned, it was on account of returning inflammation, and I found a small abscess between the layers, and near the lower part of the cornea.

The treatment was resumed, and in two days the irritation was gone, and she returned home. I am convinced that the heated aqueous humor makes the germs in the anterior chamber sick, and makes the phagocytic action of the leucocytes relatively more efficient.

Mr. Gus Newenheim, Mt. Sterling, Ill., 75 years of age.

Intolerable pain had robbed him of sleep for a week. Counted seven distinct ulcers on the cornea, including one serpigenous ulcer of considerable size. Remaining eye had been destroyed by an accident five years ago. In view of my past experience, I was able to tell him that he had little to fear. I made a treatment with the pasteurizer, and gave him



Fig. 10.

hot applications of phenol. An hour later I saw him, and he told me that he was perfectly comfortable, the first time in ten days, and was encouraged. The nurse pasteurized the eye twice a day for three days, and he went home after a week.

Case 8. Fig. 10.

Sylvia Cioni, Pawner, Ill., 25 years of age.

A husky young Italian, sent by Dr. Mertz, on account of a small white ulcer opposite the margin of the iris. Had pain and photophobia. I pasteurized him once, and the nurse repeated the treatment on the following day. He had to go home for Christmas, and on the day after Christmas he returned with a note from Dr. Mertz expressing the greatest surprise that he should have recovered so promptly. He had his eye open, and could bear the light as well as with the other eye. He was discharged without further treatment.

I have had about a dozen of these traumatic ulcers which have yielded with uniform promptness to the pasteurization.

Case 9. Fig. 11.

Mary —, 16 years of age, Philadelphia, Pa.

Seen in the clinic of Dr. L. Webster Fox. Ulceration of both eyes extending upward and involving three-fourths of the cornea. Painful, irritable and almost hopeless. After the patient had left the amphitheatre, Dr. Fox permitted me to explain the method of treating ulcers by pasteurization to his class of students, and afterwards requested me to see his instrument maker, and have him send an instrument which he could use on the following day.

I have since received a letter from Dr. Fox. He received the instrument on Thanksgiving Day, and saved the eyes of Mary. He says, "I am now using the treatment daily."

The cut represents my memory of the case, which was the same in both eyes.

Case 10.

? ? ? ? Decatur, Ill. Three superficial ulcers on one eye and two on the other. Result veritably spectacular.



Fig. 11.

Her story is as follows: Four months ago she developed an inflammation of the eyes attended by great photophobia. She was obliged to be led to the office of the oculist. After a month, during which she made no improvement, another oculist was consulted. During another month she received treatment which resulted in no benefit. A third oculist was consulted, who, after a course of treatment frankly said that he did not understand the case and consented that the child be brought to me. I know all of these men and they are all capable. I can remember a number of just such cases which have baffled treatment and made me feel sorry they ever came to me.

The above reference is made merely to emphasize the fact medical treatment is not a success in certain types of ulceration of the cornea, else some one of these three men, who are trained in the knowledge of ocular therapeutics, would have hit upon the remedy. As a matter of fact it is my conviction that many ulcers of the cornea would lead to blindness unless some mechanical procedure was resorted to.

I examined the eyes under chloroform and found the above condition. While under the anaesthetic I employed the pasteurizer in the usual manner. I was about to perform a canthotomy which, in the past has given me good results in some cases, but desisted, for the reason that I wanted to test the efficiency of chauffeage in just such a case as this, uninfluenced by any other treatment.

Forty-eight hours later I saw her, and was elated. She had both eyes open, could see to go about without difficulty and was discharged at the end of a week. I had an exactly similar case a month ago, the result of which was just as brilliant but deductions were vitiated by the fact that I stretched the lids and removed the adenoids at the time of employing pasteurization.

But, the reader may say, "Would not cauterization have done as well?" My answer is, "possibly, in a given case, it might have done as well." But, you know, "A burned child dreads the fire, and a cold child likes a warm stove." Cauterization destroys more or less normal cell tissue, even though it may be applied ever so lightly, and it must be applied with sufficient thoroughness to destroy all the infection, else the remaining living germs will thrive in the necrotic tissue resulting from the cauterization. When the ulcer is large or multiple and when the prognosis is bad, one dreads to subject the eye to an extensive cauterization lest the uneducated public may censure the procedure. The patient, also, has an opinion on the subject. His childhood dread is alive, and he begs for time.

When you say to him, "I have a warm stove that will make the eye feel well at the same time that it makes the germs suffocate with the heat," he says, "Go to it, let 'em choke, they've caused me pain enough."

The above cases are selected to represent the variety which may be met by any physician, and it is my conviction that all of us should be prepared to give this method a trial.

No bacteriological examination is necessary; all classes of germs are killed by the radiated heat, and the treatment is so simple and safe that it may be administered by anyone with a steady hand.

Note 1.—At my suggestion, for office use by the oculist, Harvey Pierce & Co., of Philadelphia, will furnish a special heavy electrode of the egg-shape type, which has the added advantage of maintaining the heat for an indefinite period.

Note 2.—Dr. H. B. Henkel has demonstrated the efficiency of the pasteurizer by using one of these instruments which I furnished, on a number of chancres and chancroid. He is optimistic.

He says, however, "The cures are effected so quickly that it is very hard on my pocketbook."

Father Ryan, who considers his eye the first to be saved by this method of applying the principle of pasteurization, sends the following message:

"What greater wonder than aviation!
What greater boon than Pasteurization!
Whose radiant heat was my salvation!
May the knowledge of sterilization
Of septic ulcers by Pasteurization
Fly to the patient's doctor
Who faces a crisis of ulceration,
Before the eye is lost!!"

A NEW OPERATION FOR THE RETENTION OF A MOVABLE STUMP AS A SUBSTITUTE FOR ENUCLEATION.

BY

VICTOR RAY, M. D.,

OPHTHALMIC SURGEON, CINCINNATI GENERAL HOSPITAL, CINCINNATI, O.

A movable stump is an ideal condition which eye surgeons have been endeavoring to obtain for a long time. Artificial globes of paraffine, glass, gold or other substances have been tried. Fat has been inserted in the capsule of tenon after enucleation, and the muscles sewn over them. The ordinary evisceration has been unsatisfactory on account of the possible danger of exciting sympathetic disease in the other eye. That a satisfactory stump which shall be freely movable and communicate the motion to the prosthesis, and which will fill the orbit without sinking, is the desideratum.

The danger of sympathetic disease is in irritating or infecting the lymph channels surrounding the long and short ciliary nerves and the optic nerve itself, so that if we can reasonably eliminate such a danger we are accomplishing something which the old evisceration did not do. The following operation has given me so far very good results, although I have used it only in about four cases. The results up-to-date have been most satisfactory. I expect to make a more complete report in a few months and will probably have more cases, and the experience

which a longer period of time will give in regard to the ultimate fate of the stump.

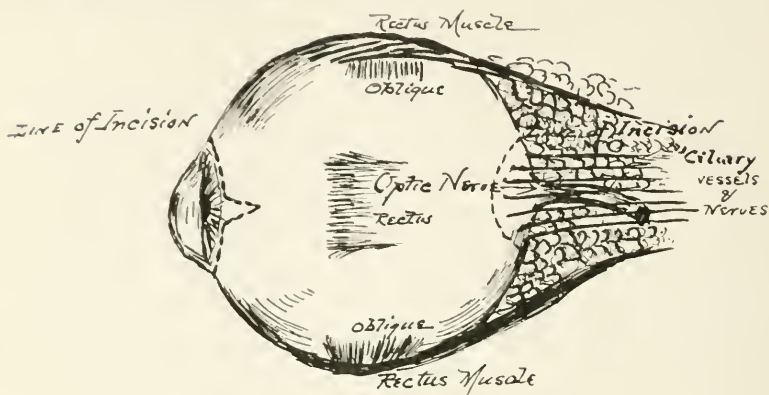


Fig. 1. Diagram Showing Lines of Incision.

The operation is similar in its first step to that of an evisceration. At first the conjunctiva is carefully dissected from the sclero-corneal border. With a Graefe knife, an inci-

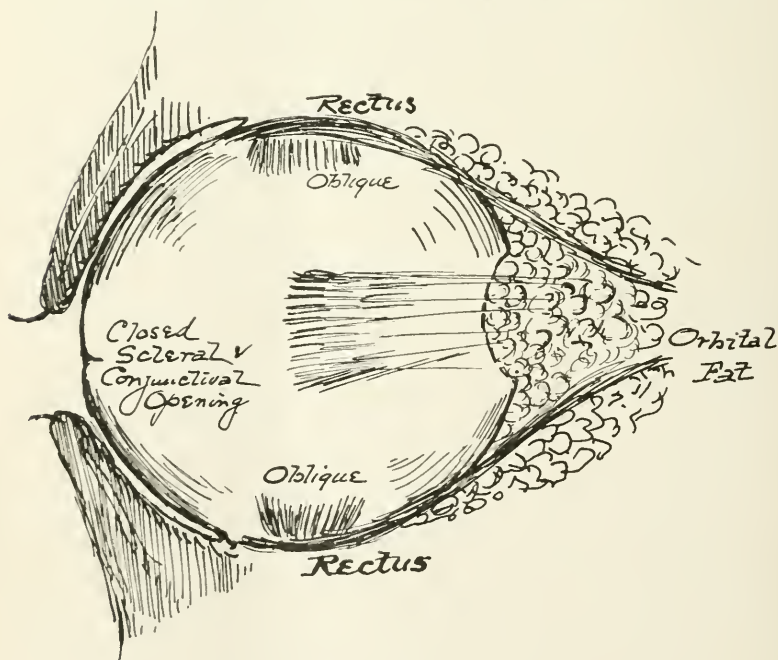


Fig. 2. Stump.

sion is made similar to the cataract incision, except that it divides the cornea in halves, the point being introduced at the

limbus and carried through to the opposite side, the incision being finished through the sclero-corneal border. Then with a curved tenotomy or iris scissors the remaining half of the cornea is removed. The next step is to carefully dissect out the lens, iris and ciliary body; these structures must be completely removed. The choroid, retina and vitreous are next thoroughly curetted. Every vestige of these structures is removed until only the white sclera remains; there should be no pigment left behind; careful wiping out with gauze is necessary and all hemorrhage should be stopped. The next step is to

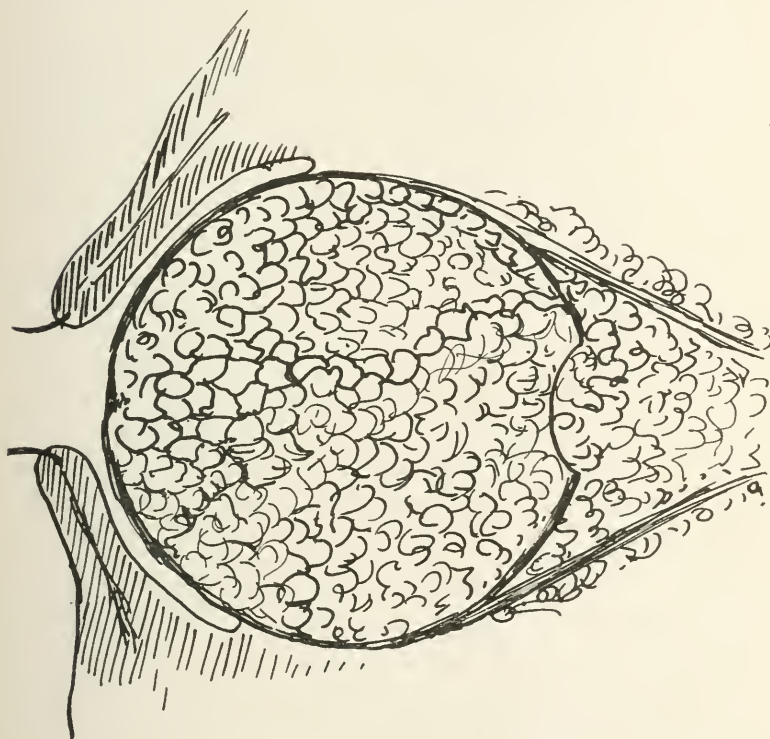


Fig. 3. Cross Section Showing Fat Which is Continuous with Orbital Fat.

completely remove the posterior pole of the globe from within the scleral sack. With a tenaculum, the sclera is stabbed and slightly drawn up, with a sharp tenotomy scissors the sclera is incised and a circular piece of about 20 mm. in diameter of the posterior pole is cut out which will include the point of entrance of the long and short ciliary nerves and the ciliary vessels to-

gether with the insertion of the optic nerve. The latter can be cut a quarter of an inch or more from its insertion. The next step is to introduce in the scleral ring thus formed, a piece of fat previously removed from the abdomen; this piece should be equal in size to the eye ball. The removal of fat should be done previous to the operation on the eye. The abdomen is prepared in the same manner as for a laparotomy, the skin being shaved and sterilized with tincture of iodine and alcohol. The fat after dissection is put in a warm physiological salt solution and kept until ready to be used. Sutures of black silk are then introduced through the conjunctiva and sclera, so as to close the scleral opening; three sutures are sufficient.

We thus have a stump which retains the natural insertions of the muscles, and is freely movable in all directions. A certain amount of shrinkage and absorption may take place; this, only time will demonstrate. The cases thus far operated upon have had no complication; a slight amount of oedema of the tissues persisted for a few days, which, however, gives rise to no discomfort. This operation is in every respect different from anything that has been thus far suggested or has had a practical use.

The importance of retaining the contour of the socket, the objectionable sinking in of enucleated cavities, the resulting conspicuousness of artificial eyes, which the reform Snellen eye does not correct except in rare cases, has made the unfortunate victim of this condition more or less a marked individual differing from his fellow men, influencing his career and frequently his earning capacity.

The main features of this operation are:

- (1) Retention of all the muscles of the ball, without disturbing their natural attachment; this includes the oblique muscles which also act upon the stump.

- (2) The removal of the posterior pole of the eye, severing all the nerves, thus obtaining all the advantages of an enucleation.

- (3) The retention of the tough scleral ring thus formed which affords support to the enclosed fat.

**CONJUNCTIVITIS AND KERATITIS FROM POISON
IVY.**

BY

J. W. SHERER, M. D.

KANSAS CITY, MO.

The following case of conjunctivitis and keratitis from rhus venenata, or poison ivy, is reported as being unique in an experience of twenty-one years.

Careful search in the Kansas City Medical Library and through the indices available of certain other medical libraries, with the aid of a skilled librarian, has totally failed to reveal a report of a similar case. The patient was a young man of markedly vigorous and athletic physique, who conscientiously coöperated with his medical attendants in every way. Every opportunity for observation was afforded by the patient, who was punctiliously faithful in attendance until recovery was complete.

First seen July 26, 1915. Courtesy of Dr. R. M. Schauf-
fler. Had sustained severe dermatitis venenata from a poison
ivy vine several days before. The skin over the left side of
the forehead and left temple, left eye-brow and eye lids and
left malar eminence was violently inflamed. There was ex-
tensive formation of confluent vesicles. Considerable serous
oozing occurred which dried into a soft yellow crust. The in-
flammation then extended into the ocular structures proper.
The conjunctiva became violently inflamed, reddened, swollen
and chemotic. Both palpebral and bulbar conjunctiva were
involved, including the transitional folds, which on everting
the lids appeared like rolls. A number of minute punctate
hemorrhages in the conjunctiva were discernible with the mag-
nifying lens. No purulent secretion was discharged at any
time. Lachrymation, photophobia and blepharospasm were
present. The pain was very severe. It increased rapidly and
became so very bad that an opiate had to be ordered with in-
structions for use in sufficient amount to control the suffering.
By no other means could the pain be subdued.

During the first week of the invasion of the eye the cornea
did not exhibit any irritative symptoms. The more painful
symptoms had begun to subside already when the first signs
of corneal disease appeared in the form of minute gray dots
of opacity varying in size from one-half to one and one-half
millimeters in diameter. These first were discovered by focal

illumination near the lower border of the limbus. Three days later several appeared near the upper border of the limbus. As many as 10 or 12 developed, all deep in the substantia propria. All were confined to the peripheral portion of the cornea and the apical region was never invaded. A faint violaceous circle surrounding the cornea indicated the degree of ciliary injection although the iris was constantly kept under the influence of atropine. The keratitis which thus developed relatively late in the course of the disease persisted correspondingly late after all other symptoms had disappeared.

Focal illumination revealed several small areas of cloudiness of the surface over the deep points of corneal opacity, but no actual desquamation of the corneal epithelium occurred at any place so there was no open ulceration nor cicatrization to contend with. The entire attack lasted about seven weeks, the occurrence of the keratitis prolonging the attack at least three weeks. The areas of gray opacity are to be regarded as accumulations of large numbers of leucocytes which have wandered into the cornea after escaping from the limbic loops of the anterior ciliary and conjunctival blood vessels. These leucocytes correspond to what was originally described by Recklinghausen as "motile corneal corpuscles."

This pathological process occurs whenever any irritant of sufficient intensity is present. The character and amount of the irritant will also determine the quantity of the leucocytic accumulation and whether this inflammatory exudate shall eventually be resolved and absorbed with little or no damage to the corneal tissue or whether a liquefaction shall occur. In the latter case the overlying layers of substantia propria break down, while the epithelium exfoliates and Bowman's membrane gives way and the more dangerous sequellae of abscess and ulcer supervene with the possibility, always, in a deep-seated keratitis like this one was, of perforation and eventual loss of the globe.

In this case all the symptoms proved easily controllable and no permanent lesions developed. The strongest mydriatic, atropine, was used throughout. Regular flushings with boric solutions and daily applications of silver were made. Hot applications and the free use of morphine controlled the pain. No iridic exudate formed and the iridic congestion disappeared under the steady dilatation.

As Nuel says, "every pronounced keratitis is dangerous." Uthoff's statistics show 27% of all blindness to be due to corneal lesions. The prognosis is necessarily serious.

The personal equation should not be lost sight of. In this case a patient with redundant vitality was aided by a skillful physician and an oculist and no permanent lesion was sustained. If the equation were varied the prognosis would become grave accordingly. Harlan has referred to seven cases of dermatitis venenata in which the well known dermatologic phenomena invaded the eye lids, which became swollen and puffy, and in some cases the eyes were closed. No mention is made in any case of involvement of the bulbar structures. Harlan also describes a case of characteristic dermatitis venenata in a very susceptible individual from dropping a solution of duboisin into the eye for the purpose of refraction. To quote literally, "there was some congestion of the conjunctiva, but the affection of the skin was entirely different from the erythematous inflammation occasionally met with in connection with conjunctivitis produced by the prolonged use of atropine."

Duboisin is the active principle from an Australian shrub, *duboisia myoporoides*. It is, I believe, ordinarily harmless and quite different from certain plants of the genus *rhus* such as *rhus venenata*, or poison ivy, *rhus diversiloba*, or poison oak, and *rhus toxicodendron*, or poison sumac. Experimentation with these plants has proven so very painful that but little progress has been made in their chemical analysis.

Maisch suggested the presence of toxicodendric acid as the toxic irritant as the result of rather meager experiments, which he never ventured to repeat.

Franz Pfaff, of the Harvard Medical Department, disproved Maisch's claim and by paying a price of considerable suffering showed the presence of a toxic oil, which he called "toxicodendrol."

Like other oils it is more or less sticky and is also soluble in alcohol and ether. Accordingly the surest way to abort an attack is to wash off the surface with alcohol or ether as soon as the presence thereon of the oil is evidenced by the familiar burning and itching.

SPECTACLE GLASS INJURY.

BY

HARRY S. GRADLE, M. D.

CHICAGO.

In view of the recent discussion in the Chicago Ophthalmological Society regarding injury to the eye from spectacle glasses, the following case is of interest in swelling the statistics of this type of trauma. The patient was first seen by my father, Dr. H. Gradle, whose notes I will copy verbatim.

March 24, 1910. R. H. K. Age 27. The cork of a pop bottle struck and broke the right eyeglass yesterday evening, causing some pain over the right eye.

Status Praesens. Left eye normal.

Right. Lids bruised, slightly scratched, and more or less puffy. Moderate diffuse ciliary injection, decreasing toward the periphery. On the cornea is one nearly vertical central cut, clean and with sharp edges, but surrounded by a cloud. There are two adjacent superficial corneal scratches. Anterior chamber empty. Adrenalin and cocain dilate the pupil moderately and uniformly. Ophthalmoscopic reflex normal in all directions. Trace of blood on floor of anterior chamber. Lens intact. No glass visible and no exaggerated localized ciliary injection. Atropine and bandage.

March 25. No pain. Lid slightly more puffy. Slight decrease in injection. Cornea now clear, except for a distinct gray edge to the wound. Corneal cloud gone. Wound reopens spontaneously and anterior chamber empties. Atropine-calomel.

March 26. No pain. Puffiness of lids the same. Ciliary injection decreasing. Corneal wound gapes on removing bandage, although there is good apposition of the lips. But on motion of the eyeball, there is slight gaping. When anterior chamber is empty, the cornea looks conical; but when anterior chamber is full pupil is dilated nearly to maximum and is round. Lips of the corneal wound slightly swollen without any increase in grayness; but streaks and cloud as on the first day. Ophthalmoscopic reflex normal.

March 28. Since yesterday, anterior chamber full. Pupil dilated not quite ad maximum. Injection about the same. Cornea clear. Oedema of lids decreasing. Aspirin.

March 29. Injection decreasing. No pain, wound closed. Cornea clear except for the superficial erosions. Slight swelling

of wound edges. Ophthalmoscopic reflex normal. Vision = fingers.

April 1. Injection decreasing. Ophthalmoscopic reflex normal. Sharp gray infiltrate of cut and erosions and apparently slight superficial irregularity at upper end. (Glass inclusion?) Differential blood count normal. Dionin.

April 4. Irritability the same. Corneal wounds the same. Vision not decreasing. Ophthalmoscopic view very poor optically, but no shadows or lesion visible. Evidently corneal infection and toxic cyclitis. Aspirin-Oleum Gaultherium-Unguent flav.-Dionin.

April 15. Slight decrease in injection so that eye is almost pale. Ophthalmoscopic view clearer, but absolutely no lesion except for astigmatic disc. Infiltration of corneal streaks decreasing and cornea otherwise clear. Vision = 6/36. Eye slightly irritable owing to omission of internal medication for past two days. T = 11½ mm. Hg. Gaultherium.

April 20. Unmistakable effects of aspirin when taken. Eye pale and but slightly irritable. V. = 6/36 +; T = 16½ mm. Hg.

April 27. Atropine effect now more persistent. Irritability decreasing. Ophthalmoscopically normal. T = 11 mm. Hg. Poor vision due to astigmatic irregularities.

October 12. Scar very delicate R. V. (corrected) = 40/45.
L. V. (corrected) = 40/50.

December 17, 1915. Corneal scars very delicate and visible only under high magnification. Iris normal. Pupil reacts well. One pigment spot adherent to larger corneal scar. Very faint subcapsular opacity in upper quadrant of lens. Ophthalmoscopically normal.

R. V. — corrected = 0.9+

L. V. — corrected = 0.9—

SYMPATHETIC UVEITIS—A POSSIBLE EXPLANATION.

BY
RODERIC O'CONNOR, M. D.

OAKLAND, CAL.

Recent work on the subject of focal infections has proven that the blood stream is infected in practically all cases. It is upon this fact that the metastatic theory of the transmission of sympathetic uveitis is based. It might also serve to explain

those cases of sympathetic inflammation where there has been no apparent break in the superficial structures. The injury serving to lower the vitality of the uveal tissue so that organisms circulating in the blood find conditions suitable for growth.

Further and more to the point Rosenow has shown that organisms growing in and producing an inflammation in an organ develop a specific affinity therefore so that on injecting these into other animals, in the great majority of cases, the resulting infection is in the organ from which they were originally obtained. For example he reports as follows:

"Thus, fourteen strains from appendicitis produced lesions in the appendix in 68 per cent of the 68 rabbits injected, which is in marked contrast to an average of only 5 per cent of lesions in the appendix in the animals injected with strains as isolated from sources other than appendicitis."

Upon learning this the idea at once occurred to me that here was the explanation for the occurrence of sympathetic uveitis and might serve to fill out the blank space in the metastatic theory. The whole theory might be stated as follows:

1. The organisms growing in the exciting eye after a variable period develop their specific affinity for uveal tissue.
2. After another variable period they gain access to the blood stream, and are carried to all parts of the body.
3. The uveal tract being the vascular tract of the eye is extremely likely to have organisms deposited or, as Dr. Rosenow says, "It appears that the cells of the tissues for which a given strain shows elective affinity take the bacteria out of the circulation as if by a magnet—adsorption."
4. Such deposit having occurred the organisms are immediately, through their affinity, able to start the characteristic inflammation, even though there be no primary reduction in the vitality of the tissues.

This idea also serves to explain the delay in occurrence of trouble in the second eye for, in addition to the delay in infection of the blood current there is the time necessary to develop the specific affinity so that, even if the blood did become infected before this was developed no sympathetic trouble could be possible. Also it serves to explain those cases of sympathetic uveitis that develop some time after the exciting eye has been removed, for the infection may have gained access to the blood before the operation and may have circulated therein some time before being deposited in the uvea of the second eye.

This idea is announced this early in hopes that some one who has facilities to prove or disprove it far superior to mine may be persuaded to "get busy." At least it is expected to arouse interest and criticism.

**LOAF SUGAR USED TO LACERATE TRACHOMA
GRANULES AT THE SAME TIME SERVING
AS A SPONGE.**

BY
FRANK G. MURPHY, M. D.

MASON CITY, IOWA.

Cane sugar has long been used as a therapeutic agent and particularly as a dusting powder for the after treatment of trachoma granulations, as suggested by Casey A. Wood and others.* However, loaf sugar, so far as I know, has not been used to destroy the granules.

Many mechanical means of breaking up granulations have been used with varying degrees of success, though none in my judgment is as efficient as the slowly soluble lump of sugar, the kind we drop in tea or coffee.

This lump of sugar has, in my opinion, several advantages over other mechanical means of destroying the trachoma granules. First, the moisture of the eye sufficiently softens the sugar so that it is an ideal rasp to lacerate the granules, and secondly the sugar lump acts as a sponge and takes up the blood, leaving the field of operation practically bloodless, which is of importance, that none of the granules may be overlooked.

The loaf sugar method, while destroying the granules does the least injury to the conjunctiva of any of the mechanical methods of destroying the granules I have tried.

* (*American Encyclopedia of Ophthalmology*," Chicago, 1913. Vol. II, p, 1381.)

TRACHOMA.

BY
SLOCUM R. EDWARDS, M. D.

CALUMET, MICH.

I trust you will forgive me if I employ your time in drawing your attention to this mysterious affection, which has time and again been the subject of discussion, especially in the last decade, but which it seems to me in spite of the unrelenting attacks made on it by superior observers and deep thinkers, still awaits the master mind to reveal its secrets.

In this advanced age of medical science it seems a wonder and a shame the way physicians and public health officers regard the prevalence of this distressing affection, trachoma, so often called "eczema of the lids." So great is our difficulty in getting co-operation from health officers, physicians, and laity, it would seem we have not advanced in controlling this disease as rapidly as we should. Ignorance among the laity of its seriousness is often caused by the physician who announces to the patient "it is granulated eye lids," probably not thinking of trachoma; but unwittingly giving the correct diagnosis. This announcement is agreeable to the patient as he has probably made a similar diagnosis himself, or some of his friends have said, "John Smith or Sam Jones had the same trouble, and he had granulated lids."

What does the laity understand by "granulated eye lids"? (It is a term which never should be used by doctors for fear of misleading results.) They interpret it as simple eczema of the lids which a "little salve or eye lotion" will relieve in a few hours. The same physician who calls all diseases of the outer tunics of the eye or lids, granulated eyes, distinguishes himself by naming all skin lesions eczema or scabies. He makes a wing shot diagnosis and follows it up with a shot-gun prescription. Granting the doctor a correct diagnosis of trachoma, what does he do next? Does he suggest a prophylactic treatment, or warn the patient of the danger to his immediate associates or family? Does he stop the child from school, or the man from work? No, because the man never felt better except for a little sore eye, and the parents object strenuously to the child being taken from school. Now here is where we must sympathize with the above criticized doctor, or any doctor who has tried in several cases to warn patient and parent, and has received no co-operation from either. Does it not tend to make him more careless in future cases?

Under these conditions we need the aid and co-operation of the health officers and state laws to enforce that which so many doctors are negligent in attempting.

In a great number of cases the initial course of the disease is so insidious, the patient is unaware of its presence until the case is well advanced. The affection is usually chronic, although acute cases may be observed in which there are marked inflammatory symptoms and profuse purulent secretions. The severity of certain attacks is probably due to a concomitant

acute conjunctivitis, injury, or continuous irritation from dirt, gas, chemicals, etc. The writer has three cases under treatment at present following injury, neither having given history of any previous attack. These are only three of the many cases the writer has recorded in the past three years which have followed injury, though a greater number show scars of previous attacks.

I shall take the liberty here to mention one case: Male, age 38 years, Austrian, occupation, miner. Patient while preparing a blasting cap on September 29, 1914, accidentally discharged the cap, receiving splinter in the left eye. Small perforating wound was made in nasal side of cornea about $2\frac{1}{2}$ mm. from center of pupil. The incision in iris was larger, extending from 1 mm. from corneo-scleral margin toward the edge, almost complete dissolution of iris. There was a large rent in the lens capsule and already a traumatic cataract had begun to form. Skiagram was taken showing foreign body about $\frac{1}{2}$ mm. above and on inner side of lens. Tried X-ray with faint hope patient might be mistaken, but with no results. Then did complete iridectomy. I then tried to remove same with forceps, using direct ophthalmoscope with as much dexterity as possible; but with same result. Covered eye, using such treatments as indicated, with idea of enucleation in next few hours.

Following morning tested right eye for vision and discovered vision of only $1/300$ with progressive choroiditis. Left eye vision 0. I waited, but continued treatment of left eye and also right eye, and to my surprise it did nicely until the fourteenth day when it showed signs of trachoma, and at end of third week it was typical. Thus I added to my chain and continued to wait. At end of six months uveitis had cleared up and also trachoma. Vision left eye $5/200$, right eye $1/500$.

Why did I wait? With hope, though faint, that if I could relieve injured eye of inflammation I would attempt cataract operation and at same time try removing foreign body. But at present writing 75% of cataract has been absorbed and with iridectomy patient has vision of $15/80$.

Man has been working for past three months. Should I now try and remove foreign body or not?

Race plays an important factor as etiological cause of trachoma. It seems to be more prevalent among Jews and Poles than any other people. Arabia and Egypt we may consider

as its real home. In Eastern Europe it is more widely spread than in Western. In the United States we find it more common in Eastern cities, especially among foreign population. Russian and Polish Jews seem to head the list. Among the mining districts it is very prevalent. Negroes seem to be the only race exempt. In 1798 a large number of Napoleon's army which landed in Egypt were attacked with ophthalmia, which at that time was diagnosed ophthalmia militaris. Fuchs states by reason of these Napoleonic wars trachoma became frightfully prevalent in Egypt. At the present time it is rare to find a native with normal conjunctiva, and a great number are blind from disease.

Under the efficient management of Dr. A. F. McCallan enormous good has been accomplished in Egypt. His statistics show that in 1912 out of 43,668 patients examined, 6,939 persons were found to be blind in one or both eyes, about 16%. If history repeats itself what will be the increase in this disease at end of present war?

With the working class we are greatly handicapped in treatment, especially among the mining men, as 90% cannot, or think they cannot discontinue work for even one day when they have only slight irritation of the eye; but regardless of their objections or cry of poverty I make it a fast rule to stop the men from work and the children from school even though I only suspect trachoma.

I have had under treatment in the past three years from 175 to 200 cases, and my observation is that it is very necessary that the eye should be put at absolute rest, covered, and all irritations removed. The same as an internist demands rest for his patients. It is very easy for the internist to influence his patient to accept the logical view of rest, as he does not feel equal to work, but with the oculist the patient cannot understand why he cannot continue his vocation when he is feeling well except for a sore eye.

It is true in a number of states that they have been fortunate in having various restrictive public health measures and medical inspection of public schools which have aided in decreasing the spread of minor communicable disease. The school has always held an important place among the recognized sources of contagion; but still I doubt if any one realizes how great a factor it is in the spread of trachoma. The child with trachoma rubs his eyes every few minutes, using that

which is most convenient, as hand, handkerchief or sleeve, to relieve the burning and itching; he then handles his books or desk mate's books, or any object which is used by other school children.

The use of the same basin for washing, the same towel for drying hands, was common in a great number of schools, manufacturing establishments, and public toilets, as well as hotels, and also in mining districts a few years ago, and even in a great number of other places today. This, I judge, has been a great cause of the spread of the disease, and probably many cases infected in this way still have the germ or toxin in the tissue in an inactive state, and are only waiting to be liberated into activity by lowering the resisting power of the tissues.

I heartily agree with Kuhn when he states that nasal diseases play an important role as an etiological factor; my records show that 80 per cent of my cases treated for trachoma in the past three years have also been to me for treatment for some irritation about the mucus membrane of the nose prior to treatment or afterward.

If I may, I will refer to schools again, as I think it of primary importance that the teacher should detect any redness or irritation about the child's eyes. It is she who sees every child at the beginning and throughout the school session. If she is observant she will notice whether the child is having trouble with his eyes, as 95 per cent of all children are anxious to relate their infirmities to their teacher, and in this way we often receive cases in their incipency. This reminder to the teacher is important in districts where doctors do not make regular visits to schools. If what the teacher has noticed is only blepharitis or conjunctivitis, so much the better, as this should be treated immediately, thereby removing any chance of an infected field for the reception of trachoma.

Medical inspection has failed to check the spread of this affection, partly on account of too much reliance being placed on medical inspectors who see the children at only very irregular intervals, and not as a teacher who sees them every minute of each school day. The school law which prohibits the principal from sending home children with trachoma is responsible for the great spread of this disease.

Trachoma may be dividend into three classes: 1, undeveloped or dormant; 2, acute or mixed; 3, chronic or malignant.

Acute trachoma of a mixed infection may continue with unabated severity for weeks or months, resisting all treatment.

My opinion is that those cases which resist for months should come under the head of the malignant type, and malignancy or chronic type in my opinion is due to the infection of tissues for months and years previously. The trachoma organism has remained dormant or inactive till some future date when the tissues have become irritated or inflamed from some local or foreign cause liberating the organism of trachoma, which immediately becomes active, and from its long sojourn among tissues about the lids of the eye is very resistant, and does not yield readily to any form of treatment. It is possible that when first infecting tissues about the eye these put up such a great fight that the organism is destroyed and the real trachoma bodies are the result of toxins formed after the death of the real organism.

A school of massage for the blind is in operation at Reuilly, France. As a result of war injuries this school is filling a large need at the present time.

The German government is granting pensions to blind soldiers amounting to from \$342 to \$1,000. Some of these get invalid pensions in accordance with the workmen's compensation act as well. Special provision for the education of the blind is being made also.

Reports of nyctalopia continue to appear in the war literature. It seems to be a question whether this condition is increasing as a manifestation of the nervous effects of trench life or whether it is only that more cases are being discovered because of the night work required in warfare. More cases are reported in winter than summer, and the suggestion is made that the strain is greater in the cold weather and conditions in the trenches worse.

REPORTS OF SOCIETIES

WILLS HOSPITAL OPHTHALMIC SOCIETY.

McCLUNEY RADCLIFFE, M. D., CHAIRMAN.

OCTOBER 4, 1915.

Dr. William Campbell Posey exhibited the following:

1. **A Case of Traumatic Ptosis Operated on by the De Wecker Method.**

The patient, a young man, had had the left upper lid torn away by a steel hook. When first seen after the accident, all but the outer third of the lid was evulsed. His family physician had sewn the lid roughly into position directly after the accident; but when first seen by Dr. Posey the lid was a shapeless mass, hanging down and over the lower lid. Dr. Posey's first procedure was to cut away all superfluous cicatricial and granulation tissue, and to reunite the edges of the wound. After the healing due to this had been effected, the lid was raised by a Tansley-Hunt operation. On account of the injury to the tissues this operation was only partially successful, the width of the palpebral fissure being but 4 mm., so a de Wecker operation was done, the subcutaneous stitches being held in position for two weeks. The ultimate effect was excellent, the fissure being now 7 mm. in size. It is thought that the effect of the operation will be increased as time goes by, as the subcutaneous cicatricial bands produced by the sutures contract.

2. **Exhibition of a Case of So-Called "Juvenile Glaucoma."**

The patient, a young man, twenty-two years of age, without any family history pointing to glaucoma, had gradual loss of vision in each eye for a year or more. Examination showed atrophic nerves with deep glaucoma cups. Tension equalled 28 mm. in each eye. The form fields were much contracted, and the color fields obliterated. Vision was reduced to 2/40 in each eye. Iridectomy was performed on both eyes under ether, with resultant 4/40 vision in each eye. Dr. Posey thought the etiological factor was probably alcohol, as the patient confessed to taking four or five drinks daily for six years or more. There was also a possibility of his having taken wood alcohol. Dr. Posey believed the glaucoma to be really an instance of the secondary type of this disease, the glaucoma cups having originated in consequence of the softening of the optic nerves from the alcohol, and perhaps an accompanying

low-grade uveitis due to the same causes, which had produced a blocking of the posterior lymph-passages of the eye.

3. Deformity of the Right Upper Lid Due to Traumatism.

Dr. Posey exhibited a case of deformity of the right upper lid in a young man which he had corrected by a blepharoplasty. The deformity was the consequence of a kick upon the orbit. The inner canthus of the right eye had been contracted downward and somewhat outward, so that the upper lid assumed the appearance of a very broad epicanthal fold. The canthus was placed in the proper direction by incising the scar tissue and sewing it in the position normally occupied by the palpebral ligament. The broad epicanthal fold was narrowed by excising a semilunar strip of skin. Healing was prompt, and the deformity caused by the accident almost entirely corrected.

A Case of Pigmentary Degeneration of the Retina Complicated by Acute Glaucoma.

Dr. William Zentmayer showed a case of advanced pigmentary degeneration of the retina in a woman fifty-eight years of age. There was a posterior polar subcapsular opacity in the lens. The unusual feature in the case was a high degree of sclerosis of the choroidal vessels. Vision in the right eye equaled 6/24. In the left there was merely light-perception. The field in the right eye showed concentric contraction to within fifteen degrees of fixation. One week before coming under observation she had had an attack of acute glaucoma, which was aggravated by the use of atropin by her family physician. The eyeball was stony-hard, and all the other phenomena of suddenly increased intraocular tension were present. Trephining of the sclera, combined with a small peripheral iridectomy, was done. The tension, three weeks after the operation, was still below normal. The patient recognized hand-movements at 1. M. Glaucoma as a complication of pigmentary degeneration of the retina has been observed several times. Instances have been put on record by Heinrichdorf, Bellarmionoff and others. Both chronic and acute types have been seen. The reason for the rise in tension has not been determined. In the above case it is probable that the high-grade sclerosis of the choroidal vessels was a factor. A sclerosis that had affected more largely the vorticoose veins than the arteries would explain the attack of glaucoma.

V-Shaped Iridotomy.

Dr. Zentmayer exhibited a patient on whom he had made a V-shaped iridotomy with a Ziegler-knife-needle four days before. There was a perfect triangular opening, the eye was quiet, and the patient readily told time on the watch. Dr. Zentmayer said that this result is not an unusual one, and that he had exhibited the case merely to demonstrate to those who had not previously had an opportunity of seeing it, the advantage that this procedure has over operations in which the de Wecker scissors are used.

Retained Steel in Eye.

Dr. William M. Sweet detailed the history of a man seventy-two years of age who had come to him for a change in the glass for his right eye. Apart from a few streaks of opacity in the cortex of the lens, the eye was normal and had never been inflamed. He stated that when a young man he had been struck in the eye with a piece of steel while using a hammer and chisel. An X-ray examination showed a piece of steel, 4x2 mm., in the posterior portion of the globe. After the subsidence of the symptoms immediately following the injury the eye had not given him any trouble, and had not caused any discomfort to the right eye; so he refused to permit the shrunken stump to be removed. As the eye had been blind and shrunken for over forty-five years, he did not feel that his right eye was in any danger of becoming affected.

J. MILTON GRISCOM, M. D.,
Secretary.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

T. N. K. SCHWENK, M. D., CHAIRMAN.

NOVEMBER 9, 1915.

The Indications for Operation in Glaucoma.

Dr. William Campbell Posey discussed this subject. Secondary glaucoma was not considered, these indications applying to primary glaucoma only. He said that operations should be performed:

1. In all cases of acute and sub-acute glaucoma, and in all chronic cases, on the manifestation of any inflammatory glaucomatous symptoms.

2. In all cases of chronic glaucoma in which there is doubt of the patient's co-operation in the persistence in the miotic treatment throughout the remainder of life. This in-

cludes practically all hospital cases and such private patients as may be of a weak and vacillating disposition.

3. In all patients with chronic glaucoma who reside at such a distance from places where proper ophthalmic care may be obtained that they are unable to report at sufficiently frequent intervals for the supervision necessary for the proper and safe carrying out of the miotic treatment, or for operation in the event that inflammatory symptoms arise.

4. In chronic patients under fifty-five years of age, when the field of vision and central vision are good, an operation upon the most affected eye is advised, miotics being employed in both the operated and the unoperated eye for the remainder of life. Operation upon the second eye should follow, if subsequent observation shows that vision is maintained better in the operated than in the unoperated eye.

5. In all cases of chronic glaucoma, without regard to age or the development of the disease, in which miotics have been given a faithful trial for at least six weeks or two months, as evidenced by the constant maintenance of pupillary contraction to almost pin-point size, and in which vision and the field of vision show progressive deterioration.

Cyclo-dialysis is preferred in all cases in which operation is demanded, if there be a hemorrhagic tendency or the field of vision is very much reduced. Iridectomy is reserved for all other cases. The trephining operation has been relinquished, as it appears to be a more dangerous procedure than iridectomy, on account of the opacification of the lens that follows in not a few cases, either immediately or remotely, after the operation. Furthermore, even in cases in which these complications do not arise, it has not been proved that the visual results after trephining are better than those obtained by a properly executed iridectomy.

In all cases not included under the five headings given above, miotics should be employed with great zealousness and persistence, four times during the day. The maintenance of vision by this method does not warrant the gloomy prognosis so often rendered in cases of chronic glaucoma.

DISCUSSION.

Dr. Zentmayer said that, considering that neither the miotic nor the operative treatment of simple glaucoma is curative, and that the non-operative treatment of any condition is preferable when it gives as good results, he thought the miotic treat-

ment to be the treatment of choice in appropriate cases. Operations should be advised in dispensary patients, if there are no contra-indications. Because of the likelihood of neglect when irksome treatment is to be continued over a long period of time, operation should be done on patients in all walks of life under fifty-five years of age. Dr. Zentmayer agreed with Dr. Posey in preferring iridectomy, except in the presence of marked angiosclerosis.

Dr. Schwenk stated that in his opinion, iridectomy with a Graefe knife is the best operation today. An iridectomy with a keratome is not equal to an upward-cut, according to his view. The reason for this opinion, he was not able fully to explain; but he thought it might be that the downward-cut closes the Schlemm's canal more than the upward incision. He believed that it is not the size of the iridectomy but the free, small iridectomy that serves the end.

Sympathetic Ophthalmia Twenty Years After Injury.

Dr. Henry L. Picard showed the case of a man who had had a piece of steel removed from the vitreous twenty years before, the eye having remained quiet until one year ago, when irritating symptoms developed (pain, pericorneal injection and bullous keratitis), which partly cleared up under treatment. Later, after a flare-up, he was admitted to the hospital for a sclero-corneal trephining, through the opening of which a small iridectomy was performed. The recovery was uneventful, and the patient was discharged. He returned later, with more pain. The eye was enucleated and a piece of steel, 5x2x1 mm., was found in the vitreous.

An Eye With Steel in the Vitreous Enucleated Fourteen Years After the Accident.

Dr. Picard also showed the case of a man who had gone blind in one eye after an accident, and said that Dr. Frank Fisher had removed the eye after a period of fourteen years, when the orb showed signs of irritation, and had found a small piece of steel lying in the ciliary region.

An Eye Showing Iridodialysis, Dislocated Lens and Ectasia of the Ciliary Region, Enucleated Twenty-five Years After Accident.

Dr. Picard also exhibited a specimen which he had removed, two weeks previously, from a colored woman, twenty-eight years of age, who had had a darning needle thrust into the eye when she was three years of age. The eye, at the time

of operation, had a tension of plus 2, and showed an iridodialysis, iridodonesis, and an ectasia of the ciliary region above and below the cornea, on the same side as the iris had been injured.

While he recognizes the fact that all foreign bodies should be removed from the eye, Dr. Picard thinks that the first two cases show that if the foreign substance becomes encapsulated, the length of time before it becomes irritating is indefinite.

DISCUSSION.

Dr. Burton Chance said that Dr. Picard's case reminded him of one of which he had had the care in Dr. Schwenk's service, a number of years before. It was that of a man who had applied for the relief of an intractable corneal ulcer. The ulcer resisted all forms of treatment and the anterior segment became so affected that the eye had to be excised. An immediate examination of the globe disclosed a good-sized metallic mass embedded in the choroid and retina, near the optic nerve; and a study of the tissues revealed evidences of extensive siderosis. It was learned later that the man had been struck in the eye by a spark from a blacksmith's forge twenty-six years previously; but no attention was paid to the injury and, until a short time before reporting at the hospital, he had had useful sight. At that time he received a trivial injury, which was followed by persistent irritation, and finally by ulceration of the cornea. Chance's observation on this case had led him to suspect the presence of retained foreign body in all cases of protracted ulceration without definite history.

Operation for Contracted Socket.

Dr. Peter N. K. Schwenk presented a case of contracted socket for which he had devised a *new operation* that, in his opinion, is superior to either the Wiener or the Maxwell procedure, at least for this particular case. The patient had lost his right eye in 1904 in consequence of a bottle explosion. The eye had to be removed. The patient had not been able to retain a glass-eye for six months or more past, owing to his not having a cul-de-sac below, and because the commissure was contracted. The operation conceived by Dr. Schwenk consists in dissecting or loosening the orbital conjunctiva from the border of the lower lid to three mm. above the stump of the optic nerve, by inserting a curved-on-the-flat scissors under the conjunctiva at the outer canthus, avoiding making any other opening in the conjunctiva. He then makes a sub-cutaneous opening from the outer canthus along the lower lid margin,

about six mm. from the edge of the lower lid down, and extending the full length of the lid, by means of a Graefe knife. He then unites the cavity of the subcutaneous dissection with the cavity of the sub-mucous dissection by cutting scissors, avoiding an external opening. Then a double needle suture is inserted, six mm. back from the lid margin, into the loosened conjunctiva, the needle being carried into the floor or apex of the sub-cutaneous dissection; thus transplanting the conjunctiva from the orbit into the sub-cutaneous cavity. Then both needles are passed through the skin or lid, six mm. below the margin, and through small pearl buttons the sutures are tied. It will only be necessary to use three sutures and insert a conformer. In this case, the stitches were removed eight days after the operation. The operation was done ten days before Dr. Schwenk made this report. He said that the conformer could be taken out and reinserted with ease, and that the result was better than he had anticipated. There was no deformity remaining, and no raw surfaces save the linear incision made by introducing the scissors and knife. All the cutting was sub-mucous and sub-cutaneous.

DISCUSSION.

In discussion of Dr. Schwenk's paper Dr. Burton Chance stated that he was of the opinion that the Maxwell operation should not be selected in cases like that which Dr. Schwenk had so successfully relieved by his ingenious procedure. In the five or six cases of the Maxwell operation that Dr. Chance had seen, and one case from his own experience, he would approve of that procedure in selected cases only. In the case of the patient shown by Dr. Schwenk, the mucous surface was unusually extensive; but, at the same time, the contraction was so great as to make it impossible for him to wear any form of glass eye. In regard to the apparent similarity existing between Dr. Schwenk's procedure and that described by Wiener at the meeting of the American Medical Association in 1908, Dr. Chance said that Wiener's operation, if he understood it correctly, consisted in an extension of the principles of the Arlt operation for the relief of symblepharon, in so far as it provides for the dissection of the mucous membrane free from the orbital mass, the suturing of it to the tarsal tissues, and the covering over of the raw surface by skin-grafts applied to a conformer worn in the socket. Dr. Schwenk's procedure, Dr. Chance continued, contains no incisions into the conjunctival

surface; for he inserted closed scissors at a small puncture over the outer canthus, carefully undermining the conjunctiva and releasing it from all adhesions to the orbital mass. After this, he inserted a Graefe knife to sever the sub-cutaneous tissues from the tarsal; thereby connecting the sub-cutaneous cavity with the sub-conjunctival. He then improvised a new sulcus, or cul-de-sac, by fastening the voluminously loose mucous membrane behind and below the tarsal tissues by means of sutures that were brought out and tied over the skin surface. Dr. Chance thought that while this operation is extremely simple, its simplicity makes it most difficult to describe.

Dr. Zentmayer said that Dr. Schwenk's ingenious operation was evidently applicable only to cases with a considerable amount of conjunctival tissue. He was still of the opinion that in cases in which the eye had been destroyed through burns, leaving little else than scar tissue in the orbit, the Maxwell operation would give the best results.

A Case of Buphthalmos Benefited by Tuberculin.

This case was presented by Dr. J. Milton Griscom, who said that the patient, a girl of twelve years, had applied to Wills Hospital for treatment August 27, 1915. Vision in the right eye was 8/200. Blepharitis marginalis and interstitial infiltration of the cornea were found with a central macula (1 mm.) and some vascularity. The anterior chamber was somewhat deepened. The iris was normal, and the pupil reacted promptly. No fundus details could be seen. In the left eye there were light-perception and projection. Buphthalmos was present. The cornea was large, with a central macula (3 mm.) and some vascularity. There was a marked interstitial infiltration. The anterior chamber was deep. The iris was normal in color, and 13 mm. wide. The pupil was sluggish. No fundus details were visible. There was slight scleral injection, also ciliary stretching. The tension equalled 43 mm. Hg. Blepharophimosis was present, with slight roughness of the conjunctiva. There was also lachrymal obstruction. The urine was negative. The family physician stated that the condition has existed for nine years. He thought that it had followed an attack of measles complicated with a tubercular element. The patient's father had died of tuberculosis, and her cervical glands were enlarged. The attack of measles occurred nine years before admission. She had been treated by various oculists at a New York Hospital, with no improve-

ment in the condition of the eyes. She was admitted to Wills Hospital on the 3d of September, and was operated upon under ether, external canthotomy with rapid dilatation of the tear duct being performed on both eyes. The Von Pirquet test was positive. Ten injections of tuberculin, 1/50 mg., were given, and ten injections of phylacogen, 2 c. c. The house tonic was prescribed. Eserine, gr. 1 was instilled into both eyes. The ocular condition gradually improved, and also the general health. Both corneae became clearer, and the left globe perceptibly smaller. There was a slight reduction in the size of the cornea and the depth of the anterior chamber. When discharged, November 10th, the iris was 12 mm. wide, and the corrected vision as follows: Right eye, sphere plus 2.25 D. equals 20/70; left eye, sphere minus 0.75 D. combined with cylinder minus 1.25 D., axis 30 equals 20/100.

A Case of Proptosis Due to an Orbital Tumor.

Dr. James Hunter, Jr., presented this case. The patient, a married woman, forty-seven years old, had had, in September, 1913, an attack of severe pain over the left eye, associated with headache. The attacks would commence in the morning, reaching their maximum intensity about nine a. m., and would compel the patient to take to her bed. The pain would last until about four p. m., when it would ease enough to permit her to resume her usual work. She had sought medical advice, with little or no relief, the pains becoming steadily worse. In August, 1914, there was pain, confined to the globe. The eye began to swell, and there was marked edema of the lids. The latter was at first relieved by cold compresses, but soon became permanent. The patient applied for treatment May 24, 1915, with much the same appearance as she presented when exhibited by Dr. Hunter at this meeting; but the globe was then not quite so prominent. She had ptosis, palpebral fissure at the mid-pupillary line, and a pupil of 4.5 mm., which reacted promptly. There was diplopia on extreme upward rotation. The tumor-mass above the eyeball, to the nasal side of the orbit, was more prominent when the patient was shown than it had been on admission. Examination of the fundi was negative. The tumor was apparently one of slow growth, springing from the periosteum of the nasal side of the orbit, 15x20 mm., with a soft point of apparent fluctuation at its temporal edge. An X-ray of the sinuses was negative.

J. MILTON GRISCOM, M. D., Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

W. H. CRISP, M. D., PRESIDING.

DECEMBER 18TH, 1915.

(Continued)

Soon following, a slight obstruction to breathing was noticed. The child's forehead was quite prominent and square shaped. Thinking the child might be luetic, I gave luetin test. Negative result. There is present now, a large, prominent tumor extending from right ear to beyond the median line. Size five inches long by two inches wide. Stands out beyond the plane of face, movable and quite hard, yet has sensation of fluctuation. A spasmodic breathing is present, whether asleep or awake, similar to action of a child after sobbing. Does not nurse continuously but stops to breathe. The tumor of the eye is bright cherry red. Fills that portion of the anterior chamber, from inner axis 165° downward and around the axis 75° , thence extends upward axis 120° , then rounding back to point at attachment, axis 165° . Its attachments seem to be in the angle between axis 165° and axis 75° . It is flattened anteriorly, posteriorly and is about 3 mm. thick at its center. It is oval in contour. The anterior surface in three-fourths of its diameter from its attachment upward is in contact with the posterior surface of the cornea. The entire posterior surface lies in apposition with the iris and lens. Its size is approximately 8 x 6 mm. The iris is dilated. Its pupillary edge of about 3 or 4 mm. can be seen back of the tumor apex, but no fundus reflex can be made out. Pupil attempts to contract when condensed light is used. Iris is hazel brown in color and is like its fellow. Sclera not at all congested or engorged and no inflammatory symptoms are or have ever been present. Eye ball is not enlarged. On transillumination, eye gives a light uniform reflection. After action of atropine, the iris is seen to be dilated a trifle. Through a slit a normal fundus is seen. The tumor apparently is not attached to the iris. The tumor mass is uniform and the surface fairly smooth, but it has an egg shell appearance. When viewed with a magnifying glass, throughout the tumor mass a faint network is seen, but no blood vessels can be made out. The tumor was removed through an incision at the limbus, near the tumor attachments. It was soft and mushy and had to be removed piece meal. Bleeding very free. The mother states that the tumor frequently lost its bright cherry red appearance and became pink-

ish. This I noticed also, when seeing the child at a second visit. The fellow eye is apparently normal and pupil reacts naturally. The pathological findings of the tumor as made by Dr. F. M. Heller are as follows: Endothelioma. Operation for the removal of the neck tumor demonstrated to be one of the thyroid glands. The age of the child being but 14 months at the time of its removal and it having been noticed as a small growth at birth, makes the case a very rare one. The second day following the removal of the eye tumor and the absorption of the blood from the anterior chamber, the lens and iris appeared in good condition.

"I do not see that any pathological connection could be possible between the eye tumor and thyroid tumor."

It was the impression of several of those who spoke upon the case reported by Dr. Wallace that there may have been some pathologic connection between the eye and neck tumors, but no microscopic examination of the latter having been made, this could not be verified nor controverted.

Penetrating Wound of the Eyeball.

Dr. Otis Orendorff made report of the case as follows:

"Mr. K. W. S., aged 33 years, farmer, in perfect health and never had any trouble with the eyes. On the afternoon of last Thanksgiving day the left eye was injured by being struck with a piece of iron chipped off a nut with a chisel. There was no pain at the time and has been none since, however, there was immediate blindness. The patient reached me about six hours later with evidence of a penetrating wound of the globe. There was a horizontal incision through the center of the cornea 3 mm. long, the foreign body also penetrated the lens, producing a traumatic cataract without injuring the iris at all. The anterior chamber was obliterated, but there was no protrusion of the iris. Taking it for granted that there was a piece of iron somewhere in the tissues the giant magnet was cautiously applied but with no result, a hand magnet was then sterilized and thrust deeply into the vitreous in different directions, but without success. The eye was then put under the influence of atropine and bandaged and the patient put to bed. The next morning there were several X-ray pictures taken, but the plates showed nothing that could even be called a suspicion of a foreign body.

(Continued)

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. F. W. Brodnick, who has been ill at his home in Sterling, Ill., has gone to Cuba to recuperate.

Dr. Wm. J. Ryan has been appointed assistant ophthalmologist to the Philadelphia General Hospital.

Optometrists of Wisconsin are seeking the establishment of a department of optometry in the state university.

Dr. Casey A. Wood of Chicago is spending a vacation in California.

Dr. Frank W. Hilscher has moved his office to the Mohawk Building, Spokane, Washington.

Drs. Murphy and Urner of Cincinnati have taken over the practice of Dr. Thomas M. Stewart, who is moving to Oconomowoc, Wis., to become a member of the staff of a sanitarium.

The Harvard Graduate School of Medicine announces a very complete course of instruction in ophthalmology for the spring and summer terms.

The following deaths of ophthalmologists are announced:
Dr. Charles M. Thomas of Philadelphia, aged 66.
Dr. J. B. Burdett of Houston, Texas.

The Oxford Ophthalmological Congress meets at Keble College, Oxford, on July 12, 13 and 14. The chief topic of discussion is on "The Relationship of Ophthalmology to General Medicine," and Sir William Osler is one of the speakers. Mr. Sydney Stephenson is master of the Congress.

The sixth semi-annual meeting of the Northwestern Ophthal-Rhin-Otic Society met in Sioux City, January 25 and 26. The following officers were elected: Dr. J. M. Banister of Omaha, president; Dr. F. H. Roost of Sioux City, vice-president; Dr. L. N. Grosvenor of Huron, secretary-treasurer.

Dr. A. E. Prince of Springfield, Ill., who has charge of the clinics for the coming meeting of the Illinois State Medical Society, is making up the list of cases and operators. If anyone wishes to present an interesting case for diagnosis or operation he should communicate at once with Dr. Prince. Every effort will be made to so distribute the work as to avoid crowding. Each table will have a bulletin indicating the particular operation in progress.

The following appointments of ophthalmologists have been announced: Dr. David L. Tilderquist, chief of the eye, ear, nose and throat department of the new Medical Dispensary of Duluth.

Dr. Frederick H. Verhoeff, assistant professor of ophthalmic research, and Dr. Clifford B. Walker, assistant in ophthalmology, in the Harvard Medical School, Boston.

Privat-docenten K. Schneider and Gilbert of Munich, professors; and privat-docent Siedler-Huguenin of Zurich, professor of ophthalmology.

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The Principles and Practice of Perimetry. By Luther C. Peter, A. M., M. D., F. A. C. S. Associate Professor of Ophthalmology, Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmologist to the Rush Hospital for Consumption and Allied Diseases. 232 pages, with 119 illustrations. Cloth, \$2.50 net. Lea and Febiger, Publishers, Philadelphia and New York.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. R. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.) A. G. Wippert (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Poli.) Richard S. Pattillo (P.-G.) R. R. Stephenson (P.-G.) A. G. Wippert (E.E.N.T.)	C. H. Francis (Poli.) R. R. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.)	S. M. Hager (Poli.) G. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippert (E.E.N.T.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lebensohn (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) D. C. Orcutt (Inf.) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Emily Selby (Inf.) Robt. Von der Heydt (Inf.) Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) C. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) R. W. Cressley (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) D. C. Orcutt (Inf.) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Emily Selby (Inf.) Robt. Von der Heydt (Inf.) Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) C. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) R. W. Cressley (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) H. W. Woodruff (Inf.) Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) C. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) R. W. Cressley (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. Clement (Inf.) H. W. Woodruff (Inf.) W. A. Fisher (E.E.N.T.) Oliver Tydings (E. E. N. T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) Oliver Tydings (E. E. N. T.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.I.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) 2-5 H. J. Morlan (P.-G.)	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	I. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

ABBREVIATIONS:

*Special operative eye clinic.

County: Cook County Hospital, W. Harrison and Honore Streets.
Harrison: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.
M. H.: Mercy Hospital.

Rush: Rush Medical College, W. Harrison and Wood Streets.
St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.
U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.
P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.
N. W. U.: Northwestern University, 2431 Dearborn Street.

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.
D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

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THE REFRACTION OF MYOPES—A CONSIDERATION OF CURRENT AMERICAN TEACHINGS.

BY
EMORY HILL, M. D.

CHICAGO.

In the hope of clearing up to some extent the confusion which beginners in refraction work experience from the variety of opinions they hear in regard to myopia, I sent a list of questions to 130 teachers of ophthalmology in American schools from whose answers certain interesting tabulations may be made. The questions were necessarily of a general sort to which categorical answers cannot be given. Some questions could be answered only after prolonged search through case records covering a period of years: which, I am glad to say, no one felt called upon to make, for such a task would be a burden which I had no desire to inflict. Seventy-eight replies were received, varying from brief statements of general rules followed in the refraction of myopia and myopic astigmatism to elaborate answers in the form of letters which are of such value as to warrant extensive quotation.

I take this opportunity to express my thanks to the large number of colleagues who generously replied. In fairness to them it should be emphasized that we recognize the impossibility of stating iron-clad rules to which every patient can be made to conform, and we simply attempt to state some general principles underlying the problem of refraction in the difficult class of cases under consideration. That there is at least a majority opinion in favor of certain thorough methods of treating these cases, based upon a fairly definite understanding of the significance of myopia and myopic astigmatism, will be shown in the tabulations which follow:

Question 1. Do you make use of cycloplegia in refracting myopes?

Sixty-four replied "yes," without qualifying their answer.

Eight use cycloplegia usually, making some exceptions.

*Read before the American Academy of Ophthalmology and Otolaryngology, October, 1915.

Three do not ordinarily use cycloplegia.

Three replied "no." without qualifying their answer.

Question 2. What is your method of using cycloplegia in myopia and myopic astigmatism in children?

Question 3. What is your method in adults less than 30 years of age?

Question 4. What is your method in adults between 30 and 40 years?

Question 5. What is your method in adults between 40 and 50 years?

Question 6. What is your method in adults more than 50 years of age?

The answers to these five questions can be tabulated under the caption:

THE USE OF CYCLOPLEGIA.

	Chil- dren	Betw'n 20 and 30 yrs.	From 30 to 40 yrs.	From 40 to 50 yrs.	Over 50 yrs.
Atropin habitually	36	11	3	..	..
Atropin usually (in preference to homatropin) ..	8	..	2	1	1
Homatropin usually (in preference to atropin) ..	7	12	11	11	..
Homatropin habitually	9	29	33	17	12
Atropin or homatropin (no preference stated) ..	3	8	4	5	3
Atropin or scopolamin	2	..	..	..	..
Atropin, homatropin or scopolamin .....	..	1	..	..	..
Atropin or duboisin	2	..	..	..	..
Duboisin .....	..	1	1	..	..
Homatropin or scopolamin .....	..	1	1	..	..
Homatropin or hyoscin	1	3	3	2	1
Scopolamin	4	4	2	..	..
Drug not indicated	1	..	..	..	..
Usually no cycloplegic	2	2	11	19	22
Never use cycloplegic	3	6	7	20	39
Weak cycloplegic up to 45 years, but no cyclo- plegic after 45 years .....	..	..	..	3	..

In this table the term "habitually" is used instead of "always" in order to include the answers of those men who recognize the impossibility of using the method in some exceptional cases which they would like to use always. The term "usually" is employed to indicate that a certain drug is preferred, but many exceptions are admitted. The drugs which have been named are generally employed in the form of the following salts and dosage: Atropin sulphate, 0.5 to 1 per cent; homatropin hydrobromate, 2 to 5 per cent (generally the weaker); scopolamin hydrobromate, 0.05 to 0.10 per cent; hyoscin hydrobromate, 0.10 per cent; duboisin sulphate, 0.5 per cent. A few men employ gelatin discs and atropin in the form of the alkaloid in oil. With the exception of homatropin, these drugs are generally used over a period of one to several days, 1 drop or 2 drops, in each eye three times daily. Homatropin is sometimes used the night before the examina-

tion and again several times within the hour preceding the examination; but more often it is limited to office use, from three to six applications at intervals of from five to ten minutes, the refraction being made after a period of one hour or one hour and fifteen minutes from the first instillation. There are some replies indicating a preference for an amount of cycloplegia between the prolonged effect of atropia and the brief action of homatropin, as three instillations of one of the other drugs mentioned in one day.

The important deduction warranted from this table is that American ophthalmologists believe in cycloplegia. Thus 73 of 78 men use some cycloplegic in myopic children; 52 of these use a stronger drug than homatropin, while 44 prefer to use atropin, the strongest of cycloplegics. In the case of adults less than 30 years of age, 70 of the 78 men use some cycloplegic, 16 use a stronger drug than homatropin, while 11 prefer atropin. In the group of adults between 30 and 40 years of age, some cycloplegic is insisted upon by 60 of the 78 men; something stronger than homatropin is used by 6, while atropin is preferred by 5. In adults between 40 and 50 years of age, 39 (one-half of the entire number) use some cycloplegic, homatropin being the favorite drug in this and the preceding group. Even in patients beyond the age of 50, 17 men use a cycloplegic; this does not include the use of cocain and euphthalmin for mydriasis.

Question 7. Do you prescribe the full astigmatic correction for myopes? If not, what exceptions do you make?

Fifty habitually give the full astigmatic correction.

Twenty-three do the same except in the case of a very high astigmatism where they give a partial correction.

Two usually cut the astigmatic correction slightly (0.25 or 0.50 D.).

Three habitually give only a partial correction for astigmatism.

Thus seventy-three of seventy-eight replies indicate the desirability of correcting as fully as possible the existing astigmatism; a minority granting the desire of the patient to have the glass which gives more immediate comfort when the astigmatic error is high. This applies generally to individuals who have not worn glasses in youth.

Question 8. How much of the myopic correction do you prescribe in cases of 3 D. or less?

Question 9. How much in cases of 3 D. to 6 D.?

Question 10. How much in cases of 6 D. to 10 D.?

Question 11. How much in cases of 10 D. to 15 D.?

Question 12. How much in cases of more than 15 D.?

The answers to these five questions can be grouped under the heading:

CORRECTION OF MYOPIA ACCORDING TO THE AMOUNT OF ERROR.

	Less than 3 D.	Between 3 and 6 D.	Between 6 and 10 D.	Between 10 and 15 D.	More than 15 D.
Full correction	62	48	37	15	14
Nearly full (less .25 or .50 D.)....	9	12	6	12	14
All that age and accommodation will allow with comfort.....	5	16	27	40	41
Partial correction (1 D. to 3 or 4 D. less than full).....	..	..	6	8	6
Full or slightly over.....	1	1	1	..	1
Overcorrection .....	..	..	..	1	..
According to fundus.....	..	..	..	..	..
No rule	1	1	1	1	2

This table seems to me very instructive. The majority of seventy-eight ophthalmologists are in the habit of giving the full myopic correction except in the rare cases of very high errors. A considerable number make only a trifling reduction from the full correction, and two men habitually overcorrect myopes. To this showing in favor of a practically full correction must be added the observation that the heading "All that age and accommodation will allow with comfort" generally means (as a reading of the full replies would show) as close an approximation to the full correction as is possible in each case. The men who have answered in this way have often supplemented their answers by emphasizing the ideal of full correction which they cannot attain in cases which have been neglected in youth. Scarcely 10 per cent of all the replies indicate a disregard of the principle of full corrections.

Question 13. Do you advise every myope to wear glasses for distance? If not, what exceptions do you make?

Question 14. Do you advise every myope to wear glasses for near? If not, what exceptions do you make?

The answers to these two questions may be grouped together as follows:

	Distance Glasses	Near Glasses
Always advise	41	32
Usually advise	20	24
Frequently do not advise.....	13	26

Thus more than 50 per cent of the seventy-eight men consider that all myopes should wear glasses for distance, while nearly 50 per cent think that all myopes should wear glasses for near. The diversity of opinion on these questions is less than the table would indicate, if one considers the exceptions

made to the general rule of prescribing lenses for these cases. For example, patients with very small errors (-0.25 or -0.50); patients with no astigmatic error; patients who will report every few months for observation; patients who object strongly to wearing glasses on the street; patients whose myopia is precisely balanced by their presbyopia, etc. After allowing these exceptions there remains the great body of myopic individuals for whom the ophthalmologists quoted would prescribe glasses for constant use, if my interpretation of their replies is correct.

Question 15. About what proportion of your cases wear one correction for all purposes?

Question 16. Can you classify your cases in this respect according to age and according to the amount of myopia?

The answers to the first of these two questions frequently covered the second as well.

PROPORTION OF CASES WEARING ONE CORRECTION FOR ALL PURPOSES.

Nearly all young patients.....	43	75 per cent	3
The majority of all patients.....	6	60 per cent	1
Large proportion of the young, few of those over 30..	3	50 per cent	1
Ninety-five per cent.....	1	40 per cent	1
Ninety per cent.....	3	Very few	1
Eighty per cent.....	2	No answer	13

Fifty-seven men did not answer separately Question 16 since their reply to the previous question indicated that ability to wear one pair of glasses for all purposes is largely a matter of youth. Some emphasized the factor of small errors and previous adequate correction. It seems to be agreed that individuals with high errors and those who have had no glasses or very partial corrections in youth have difficulty in maintaining accommodation for near vision with an adequate far seeing glass. Twenty-one replies to Question 16 specified that the young and the cases of low error wear one pair of glasses for all purposes.

Question 17. Can you make any observations from your personal experience in regard to the success of your method of treatment in preventing the increase of myopia?

The majority of replies to this question indicate satisfaction on the part of the ophthalmologist with his method, while a few express no enthusiasm for any method and feel that the problem of myopia has not been solved and even that its solution is divorced from the realm of refraction. Forty-one men believe that the use of cycloplegia extensively and the constant use of the full myopic and astigmatic correction are the surest

preventives of increase in myopia. Four men express faith in the opposite method of scant use of cycloplegia and wearing only a partial correction. Two men do not use cycloplegia, but prescribe full corrections. One man emphasizes the value of giving a restful near glass, and always prescribes bifocals. This he believes to be the secret of success. Five men emphasize the importance of a full correction of astigmatism and of hyperphoria, together with attention to hygiene. One man says that myopes must give up all near work. Two men feel that when myopia develops in youth it will increase in spite of all treatment. Two men state that they do not see progressive myopia. One man has seen only one case of "malignant" myopia in 15 years. Three men think that glasses have no influence upon myopia. Three men regard heredity as the principal factor. Thirteen attempt no answer to this question.

It is unsafe to draw hard-and-fast conclusions from a small number of observations, especially when the personal bias of the one reviewing the data enters into the judgment. Allowing for these factors, I believe that the following statements may fairly be made as a résumé of the teachings of the seventy-eight ophthalmologists whose views have been tabulated:

American teachers of ophthalmology believe in the thorough use of cycloplegia in the refraction of myopes (more than 90 per cent).

They believe in the full correction of the astigmatism existing in myopic cases (more than 90 per cent). The exceptions to this rule are in the very high errors which have not been corrected in youth.

A large majority regard the full correction of myopia as the ideal to be sought, while many think this ideal unattainable in cases which have gone through childhood and early adult life with no glasses or inadequate glasses.

A majority think that myopes should wear glasses constantly. A majority expect patients under the presbyopic age to wear one correction for all purposes. A majority regard the wearing of the full myopic and astigmatic correction, based upon the findings under complete cycloplegia, to be the surest means of preventing the progressive increase of myopia.

Among the men whose opinions are highly valued in this Academy, some have written their views at length. I shall quote from them as representatives of the current American

teachings. The following remarks are selected from the replies of Drs. Alexander Duane, John Green, Jr., Edward Jackson, Samuel D. Risley, Samuel Theobald, Casey Wood and Hiram Woods.

"I consider it exceedingly important that the ciliary muscle be completely under the influence of the cycloplegic and the choroidal congestion be allowed to subside before refraction is attempted. Numerous cases come into my hands in which myopia has been overcorrected by opticians, and, I regret to say, by oculists who use cycloplegia carelessly or not at all."

The correction "depends on visual acuity, condition of fundus, age, and finally determining how much the patient will take comfortably. I come as near total correction as possible, if the fundus is good and if accommodation develops. If it does not, I reduce the correction to the point of comfortable tolerance."

"I have regarded myopia as pathological . . . it must be treated from that point of view; in correcting the refraction error a cycloplegic is just as necessary in myopia as in hypermetropia; that since the myopic eye is a pathologic eye the cycloplegics are even more necessary because of their remedial influence over the pathologic condition of the uveal tract. I have never hesitated to use the atropia or hyoseyamin sulphate three or four times daily for long periods of time at any age or any degree of myopia or myopic astigmatism in more or less malignant choroidal conditions, but have often employed at the same time weak solutions of eserine salicylate (grain 1/20 to 1/40 to fluid ounce 1) twice daily, not to counteract the mydriasis of the cycloplegic, but because of the physiologic influence in contracting the dilated anterior ciliary vessels. . . . I prescribe full corrections up to 15 D. and always a full correction of the existing astigmatism. Many myopes have high degree of hyperphoria. This I have always been careful to correct either with vertical prisms or by cautious tenotomies. . . . After 50 years of age I prefer homatropin solutions three or four times daily and the eserine solution at bedtime and in the morning."

"In practically all my refraction cases, from 8 to 45, and in nearly all examined for the first time between 45 and 49, I use homatropin. I make no distinction in this regard between myopia and hypermetropia. In cases over 40, and in others, too, if I think there is any possibility of glaucoma, I test the

tension before recommending homatropin. . . . In cases in which the range of accommodation remains high (above 1 D.) in spite of repeated instillations of homatropin, or in which the results are usually varying, or in which skiascopy shows a varying, evidently unrelaxed, accommodation I proceed to the use of atropin just as for children under 8. And I find it necessary to do this fully as often in the case of persons over 40 as in younger people. It has been my experience that it is just in these older subjects that it is hard to get the accommodation to relax. . . . My cardinal principle in applying the correction in myopia is thus stated: Whenever possible the patient should wear (a) the full correction of his myopia and (b) wear the same correction for distance and near. . . . My experience has been that in myopia of under 10 D. I can in almost every case, and in myopia of 10-15 D. I can in a vast majority of cases prescribe the full correction with satisfaction, comfort and advantage to the patient. This is occasionally possible in patients over 15 D. . . . Of course, the younger the patient the easier it is to apply the full correction. But in older subjects seen for the first time I should always feel inclined to order the full correction experimentally, believing that in the great majority of cases the experiment would succeed and that, if successful, it would afford the patient more relief than would an undercorrection."

"Moderation in the near use of the eyes, proper lighting and avoidance of the stooping position are important; but far more important is the correction of accompanying astigmatism, anisometropia, and heterophoria, both in far and near, but especially in near vision."

"I am sure that, since I have treated young myopes with total correction, provided they have good fundi and normal vision, I have seen fewer cases of progressive myopia. . . . I do not see how one can come anywhere near accuracy without cycloplegics."

"Under the continuous wearing of the full correction increase of myopia is rare at any age and under any circumstances. When it occurs it ceases after repeated correction."

A different emphasis on treatment is indicated in the next quotation: "In treating myopia of the (possible) progressive variety the use of glasses is but one—and a relatively small—factor. To be rigidly insisted upon in addition are the usual rules of ocular hygiene. In the hereditary type, especially, care

in the amount and time of reading and other near work, outdoor life, illumination, the state of the health, use of atropia, tinted lenses, oculomotor exercise, sort of type of books, etc., are quite as important. In about one-third of these cases in particular, I am unable (for various reasons that might well fill a volume) to prevent the slow but certain progress of the myopia. I console myself with thinking, however, that if nothing had been done the 4 or 5 D. myope might have gone on to 10 D. or more."

In conclusion, I would emphasize that a majority of seventy-eight American teachers of ophthalmology believe in a painstaking and time-consuming scientific method of refracting myopes, and moreover, that this method is advocated with enthusiasm by a considerable group of those whose positions as leaders in our specialty entitle their views to the utmost respect. My brief investigation reveals no extensive opposition to these views; yet here and there conflicting teachings are producing confusion in the minds of students and bringing discredit upon the profession who should exhibit some uniformity in a practice which is supposed to be based upon an exact science. I venture to hope that such an organization as this Academy may help to standardize teachings on such important subjects.

NOTE.—The 130 men whose opinions were sought include the teachers of ophthalmology as found in the catalogues of the medical schools which constitute Class A of the last classification of the Council on Medical Education of the American Medical Association, and teachers in the various postgraduate institutions of the United States.

CONCERNING THE ETIOLOGY OF IRITIS AS DETERMINED BY LABORATORY METHODS, AND ITS TREATMENT, ESPECIALLY BY BACTERINS.

BY

WENDELL REBER, M. D.

PHILADELPHIA, PA.

In this communication, which is largely in the nature of a preliminary one, I am impelled to bring before you the question of the etiology of iritis largely by a feeling of profound dissatisfaction with the present-day statements as to its etiology. A survey of many recent text-books reveals approximately the following classifications:

1. Iritis Syphilitica.
2. Iritis Rheumatica.

*Presented to the American Academy of Ophthalmology and Otolaryngology at the Chicago meeting, October 6, 1915.

3. Iritis Gonorrhoeica.
4. Iritis Scrofulosa.
5. Iritis Tuberculosa.
6. Iritis in acute infectious diseases.
7. Iritis in disorders of metabolism.
8. Iritis traumatic.
9. Iritis sympathetica.

Manifestly, this classification merely enumerates the varieties of iritis. It is a clinical classification pure and simple and advances us precious little beyond the classifications of 50 years ago. Writing in 1898, Bradley, the elder, said (Norris & Oliver, *System of Diseases of the Eye*. Vol. III, page 285): "Syphilis is without doubt the most common predisposing cause of iritis. Most authors credit the venereal disorder with 50 per cent of all cases, but that estimate is too low, especially if hereditary syphilis be taken into account, and the proportion probably lies nearly 60 per cent. Rheumatism is responsible for most of the other cases, so that we shall not be far wrong if we lay 30 per cent to the score of that ailment. The remaining 10 per cent are due to various causes, of which injuries, gonorrhea, gout, diabetes and malarial and other fevers are probably the most important. We may vary this statement by saying that out of every 10 cases of iritis, six will in all likelihood be the result of syphilis, inherited or acquired, while three will be caused by rheumatism and one by some one of the other conditions above enumerated," deSchweinitz quotes Alexander (*Syphilis und Auge*) to the effect that syphilis has been found to be the cause in from 30 to 60 per cent of all cases. deSchweinitz also makes a most trenchant *observation* when he says, "Iritis is also divided according to its *supposed* (*italics my own*) etiology into syphilitic, rheumatic, gouty, gonorrheal, diabetic, tubercular, scrofulous, cachectic, traumatic and sympathetic iritis." The word "*supposed*" in the foregoing sentence indicates this acute observer's dissatisfaction with the present-day classification. Nothing could be more illuminating than his recent discussion of this subject in the *OPHTHALMIC RECORD* for December, 1915, published since this paper was presented to the Academy. The statistics up to the present day are not without interest. H. H. Brown (*Annals of Ophthalmology*, April, 1890) found 55 to 65 per cent of all his cases of iritis to be syphilitic, while a proportion varying from 10 to 20 per cent he credited to arthritic toxins. Jennings and Hill (*Oph-*

thalmology, Vol. VI, page 52), tabulating 500 cases of iritis from the records of the Wills Eye Hospital, put down syphilis as the cause in 61.4 per cent and rheumatism 25.4 per cent of the cases; gonorrhea at 5 per cent and other general systemic disorders as 8 per cent. Of 159 cases of primary iritis studied in the wards of St. Bartholomew's Hospital between 1883 and 1900, Yeld (Brit. Med. Jour., May 13, 1911) found 29 per cent certainly syphilitic, and 17 per cent probably specific; 16 per cent seemed rheumatic, but careful analysis of the so-called rheumatic cases failed to show positive evidence of true rheumatism. Eight per cent were certainly gonorrheal and 7 per cent were probably due to gout, 1 per cent was osteoarthritic and 10 per cent were obscure, the latter being most common in women. Among the latter, exposure to cold seems to have been a prominent factor and the majority of such patients were admitted in February. Harrison Butler, 4 years ago (Brit. Med. Jour., April, 1911) called attention to the discrepancies in the reports of various authorities on the frequency of the etiologic factors in the production of iritis. For instance, Kenneth Campbell found 70 per cent of all iritis due to syphilis, 20 per cent to gonorrhea, 9 per cent to oro-alimentary, uterine and tubal infection and 1 per cent to tuberculosis. He absolutely denies the existence of rheumatic iritis, in which opinion one might observe he is joined by deSchweinitz. Römer found 25 per cent due to syphilis, Worth 30 per cent, and more than 50 per cent to oral sepsis and kindred conditions. In view of this wide divergence of opinion Butler thought it worth while to go through his case books (both private and hospital) to determine what proportion must be allowed to the different sources of infection. The net result of his inquiry was that, in at least 30 per cent of all cases it was impossible to determine the real cause of the disease, 25 per cent were due to syphilis, and 5 or 6 per cent could be termed truly rheumatic. Three years ago L. Bach (Zeitsch. f. Augenh., Jan., 1912) collected all cases of so-called primary disease of the uveal tract observed at his clinic during the last 16 years—numbering about 400—and had them re-examined as far as possible and had Wassermann's test made. The most significant passage in this whole article is the statement that "very often the history of the case and the most careful general examination revealed no clue as to the etiology. This was true in 47 per cent of the cases of iritis and 59 per cent of the cases of choroiditis."

To what does this array of discrepancies amount when submitted to critical analysis? Simply this, it amounts to precisely nothing. All the classifications and percentages above quoted are based on clinical findings and as long as we adhere to that basis of classification alone we shall be floundering in the pool of empiricism.

One thing is certain, namely, that an important percentage of all cases of iritis is due to syphilis, but how many? According to the figures reported anywhere from 20 to 70 per cent. It is no exaggeration to say that if such a variation were submitted in evidence in any other department of science, the evidence would be laughed out of court. It may well be asked, is there any prospect that we shall soon find a way out of this maze of contradictory evidence, and if so, how shall we come to a knowledge of the true percentages? The answer would be that in the present state of our science the percentages cannot be fixed with absolute accuracy. But I would in the same breath humbly submit that if recent laboratory methods are rightly utilized we shall come much nearer the truth than we have yet approached. The history of the case and its clinical aspect can never be disregarded, but if, in conjunction with these, the laboratory reports are allotted a proper place I believe we shall discover much that will surprise us.

The laboratory findings that are now at our disposal fall under what are known as complement fixation tests and comprise reactions as to the following organisms:

The *Spirocheta pallida* (Wassermann test).

The *Gonococcus*.

The *Pneumococcus*.

The *Streptococcus*.

The *Staphylococcus Albus*.

The *Staphylococcus Aureus*.

The *Bacillus Influenza*.

The *Bacillus Coli*.

The *Micrococcus Catarrhalis*.

Five of these organisms have already been shown to sustain a causative relation to iritis. The *Spirocheta pallida* and the *gonococcus* are already well known in this relation. Bradburne (*Ophthalmology*, Vol. VIII, page 175) has shown the *streptococcus* as causative. Gray Clegg (*Ophthalmoscope*, Vol. XIII, June, 1915) has recently reported uveitis going on to enucleation in which the *pneumococcus* was the sole organism cultured

from the specimen. It is noteworthy that three other ophthalmic surgeons who saw the case with Clegg diagnosed a tubercular process. Finally I have recently reported a relapsing iritis that seems to have been due to post-influenzal toxins, Wassermann, gonococcus and all others save influenza fixation tests being negative. It responded beautifully to influenza bacterin without any other internal treatment. There is little reason to doubt that the staphylococcus family will sooner or later be similarly held on the same count.

Jellett (Ophthalmic Review, Vol. 24, page 41) has just recorded a case of iridocyclitis which had trypanosomiasis as its underlying cause, which is far afield from our usual ideas of causation of this malady, but at the same time points out all too plainly the need for exhaustive study in every case of iritis that is not frankly syphilitic.

In the past year I have studied 15 cases of primary acute iritis, 10 of which were in private practice and 5 in hospital practice. In every one of these 15 cases a complement fixation test for the following organisms was made:

Wassermann (Noguchi and cholesterin).

Gonococcus.

Pneumococcus.

Streptococcus.

Staphylococcus albus.

Staphylococcus aureus.

Bacillus Coli Communis.

Bacillus Influenza.

Of these 15 cases 5 were clinically syphilitic and gave frankly positive Wassermann reactions. These were certainly syphilitic. Three gave a negative Wassermann, but a positive gonococcus reaction. In no one of these cases was gonorrhea clinically in evidence in spite of the closest study. Their gonococcemia was therefore latent and could be recognized only by the complement fixation test, which when positive is of the greatest value. Moreover, it may be held now as fairly conclusive that a positive gonococcus fixation test is not to be expected in the course of an acute gonorrheal infection, or within 6 to 8 weeks from the time it began to subside. It is only when after the lapse of some months the organism has gained entrance to the general circulation that a positive fixation test may become possible.

One of the 15 cases was negative to all but the influenza

baeillus to which the reaction was positive. The prompt results of treatment with influenza bacterin seemed to clinch the etiologic diagnosis in this case.

Another of the 15 cases was negative to all the organisms mentioned. This case exhibited 13 recurrences in 15 years and is undoubtedly autotoxemic, as treatment on this basis will absorb most of his attacks, oftentimes without the use of any atropine at all. He frequently shows indican in his urine. It is a matter of exceeding interest that iritis has occurred in 8 other members of this man's family, including cousins, aunts and uncles (two generations). This would indicate undue susceptibility of the iris tissue in this family to any toxic substance present in the blood current.

One other of the 15 cases was negative to all the organisms mentioned. Clinically this man was tubercular, as he was the subject of tubercular joint disease, so that with the exclusion of the other factors his was probably a case of tubercular iritis. Unfortunately he left the hospital early and his case could not be followed up.

This disposes of 11 of the series of cases. Of the remaining four, two cases were studied in women of both of whom all the laboratory tests and the teeth were negative. Both of them improved greatly on injections of influenza serobacterin, one promptly and the other slowly. Hence we are justified in the suspicion that they were quite as likely due to post-influenzal toxins as to any other cause and probably more so. The two remaining cases occurred in men, one of whom presented a low form of iritis complicating a pre-existing choroiditis and I am strongly inclined to suspect syphilis in his case in spite of the negative Wassermann. The other man had a typical plastic iritis, but negative laboratory reports all through. This man was a hospital case and disappeared before his case could be adequately studied from the clinical and historical standpoint.

To summarize, therefore:

Of 15 cases of primary iritis 5 were certainly syphilitic.

Three (20 per cent) were certainly due to the activity of the gonococcus.

One (7 per cent) was due to gastrointestinal toxemia.

One (7 per cent) was most probably due to tuberculosis.

Two (14 per cent) were negative to Wassermann and doubtfully syphilitic.

Two (14 per cent) were negative to all laboratory tests and

the history and clinical aspect of the cases were against syphilis. They had both had influenza 2 or 3 months prior to the iritis, but their accessory sinuses were pronounced negative after a thorough-going rhinologic examination. As a therapeutic test they were both treated with influenza bacterins and both made final recoveries. The long-drawn-out one of these cases, which was really a uveitis, also had a long course of iron, quinine, strychnia and arsenic.

Briefly, then, of the series, 33 per cent were certainly syphilitic, 14 per cent were possibly syphilitic, 20 per cent were gonococcal, $6\frac{1}{2}$ per cent were influenzal, $6\frac{1}{2}$ per cent were tubercular, $6\frac{1}{2}$ per cent were autotoxic, 14 per cent were obscure in origin.

These percentages take into account the laboratory tests, the clinical aspect of the eyes, and the history of the case, and this we believe to be at the present writing the nearest approach to accuracy that can be obtained in working out a true etiologic classification. It would be absurd to offer or even attempt to offer any working conclusions based on so small a number of cases. As I have already said this is but a preliminary communication and is presented because of its suggestive help. Let me here intrude the hope that in a year, or at most two years, a sufficiently comprehensive array of cases may be brought forward on which conclusions may be built up.

Lest some captious critic may assail the reliability of the present-day complement fixation tests, I think it may be said that as far as the Wassermann test is concerned its findings are fairly accurate if the latest technique is rigidly adhered to. It is perfectly true, as shown by Uhle and McKinney (*Jour. A. M. A.*, Sept. 15, 1915), that there is a greatly varying equation of error in the reports of different serologists, varying from 5 to 50 per cent. I cannot refrain from quoting their closing sentence, to-wit:

"Leaving aside the element of personal equation, serologists cannot obtain uniform results unless a standardized antigen is employed and a uniform technique is agreed upon." Personally, I am not willing to lay aside the element of personal equation. If one serologist can show an equation of error of but 5 per cent, it would seem that other serologists could by rigid adherence to the most successful technique arrive at the same degree of successful results. At this particular juncture I wish to acknowledge my great debt to Drs. A. P. Hitchens and

Claude Brown of Philadelphia for their unfailing courtesy and unceasing energy in conducting all the laboratory tests referred to in this communication.

The gonococcus complement fixation test has also been criticized as to its uncertainty and Drs. Kolmer and Brown (*Jour. of Infections*, Vol. 15, July, 1914) have said very frankly, "The reactions (gonococcus complement-fixation) are not generally as satisfactory as those occurring in the syphilis reaction because the quantity of gonococcus antibody is much smaller unless grave and widespread gonococcus metastases exist." On the other hand, a positive gonococcus complement fixation test is of the greatest value and I have made a diagnosis of gonorrheal iritis only in those cases in which the reaction has been positive. The reaction for pneumococcus, streptococcus, staphylococcus and influenza are as yet not as reliable as the syphilis and gonococcus fixation tests, but if available they should be carried out even if they only occasionally furnish positive reactions. The one case of influenzal iritis I have reported seems to me to justify this attitude.

Treatment.

As to treatment, it will go without saying that in the presence of a positive Wassermann our therapeutic course is plain. Salvarsan and neo-salvarsan are brilliantly efficacious under such circumstances. Nothing has been more interesting, however, in the past two or three years than to see our syphilologists come back to the use of mercury in addition to the arsenical preparations in the treatment of syphilis. Six years ago at the meeting of the Medical Society of the State of Pennsylvania I hazarded the opinion that it would be wise to hold fast to our good friend Mercury as an antidote to Venus until our new friend arsenic had proven its worth and I am today as unwaveringly devoted to Mercury as I was then.

But it is to the iritis of non-specific characterization that I wish to direct especial attention. In this class, which assumes a formidable minority, we may sometimes secure a positive gonococcus fixation test, in which case the indication for bacterin or vaccine treatment is plain. The results also abundantly justify this claim. The relief from pain following the use of bacterins (gonorrheal or others) in iritis of nonluetic origin is almost as prompt as that following the use of morphia. Even in the presence of a negative gonococcus fixation report, if there were arthritic involvement of any degree whatsoever, I

should not hesitate to use a Neisser mixed bacterin, not only as a therapeutic measure but as a therapeutic test.

Some comment should be made on the fact that rheumatic iritis has not only not appeared in the classifications above presented but has not even been mentioned in this communication. This is because of our belief that cases heretofore so classed are either due to latent gonococcemia, pyorrheal poisoning or to gastric intestinal toxemias. Rheumatic iritis as a nosologic entity is destined to eventually disappear from our text books and literature.

If there were no arthritic manifestations and all other courses could be excluded, I feel that experimental injection of influenza mixed bacterin is justified. According to our present-day experience it can do no harm and it may surprise us by doing unexpected good, in which case we shall have applied a therapeutic test that is of no mean value.

Nothing would be further from my purpose than the advocacy of indiscriminate bacterin therapy. It is a danger with which the profession is just now gravely threatened. My whole plea is for the most exact indications for any therapy by means of laboratory tests, close clinical observation and the carefulest study of the body metabolism. If I said nothing about the local treatment of iritis it is because of my feeling that the profession is practically a unit on that point. What the ophthalmic profession just now needs in the domain of the uveal tract is not more treatment but *more light*, which we fervently hope will lead us to better and more accurate treatment of this malady that is fraught with such grave consequences to the precious function of sight.

THE LINEAR METHOD OF CATARACT EXTRACTION. CASES SUITABLE FOR IT AND ITS ADVANTAGES.*

BY

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CHICAGO.

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It seems to the author that the linear method of cataract extraction has a considerably wider field of application than is usually accorded to it. The thought that its merits and

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advantages may be not widely enough known, particularly to some of the younger ophthalmologists, seemed a justification for a brief paper on the subject hoping by this means to arouse a consideration and discussion that might prove useful.

In the linear method of extraction, as its name suggests, the incision is a straight one, and for making such an incision no instrument is as good as a lance shaped knife, such as a keratome.

The incision need not, in most cases suited for the operation be a long one, but to insure that it be long enough a wide keratome should be used, so that the cut may be 8 to 10 mm. in length if it is thought necessary, and the length can be obtained with one thrust of the blade.

The advantages of such a straight keratome incision are self-evident. The coaptation of the lips of the wound is more exact than when the incision is made with a narrow bladed knife with puncture, counter puncture and outward cut, and hence healing is more prompt. Again, with the short, straight incision the danger of gaping of the wound is less than with the long incision in the flap operation and therefore the likelihood of post-operative complications is reduced.

Before describing the detailed technic of the operation, it may be well to consider the indications for its use and the class of cases in which these indications may appear.

Speaking broadly this method is applicable for the extraction of any cataract that can be delivered through a straight cut in the cornea not longer than 10 or 12 mm. Of course this precludes its use in senile cataract in which the nucleus is so large that it cannot be delivered through such a small opening.

But up to the age of 35 or 40 years the nucleus of the lens is usually so small that it will readily escape through an opening of this size. The late Dr. Chas. Beard, who was quite partial to the linear method in suitable cases, told me that he had repeatedly used it for extraction in cases 40 years of age and even as old as 45 years.

My own experience includes only one case of full sized cataract in a person as old as 40 years treated by this method. In this connection, however, one should remember that the central portion of the lens becomes sclerosed at a younger period of life in some persons than in others, and given a case of 40 years, one should be prepared to enlarge the incision if necessary, which could be done with a suitable pair of scissors.

Specifically then, the method is applicable in the extraction of all soft cataracts, i. e. those in which a nucleus has not yet formed or is so small that it will readily escape through an opening made by a linear incision, not larger than 10 mm. This will include lamellar cataracts, juvenile cortical cataracts and capsulo-lenticular cataracts in young subjects, as well as any other form of soft or fluid complete cataracts in young adults under the age of 30 or 35 years, whether occurring spontaneously or as the result of injury.

Traumatic Cataracts.

The method is applicable and indicated for the removal of traumatic cataracts in persons up to the age of 35 or 40 years in which there is reason to believe the lens is devoid of a nucleus. In such cases if the capsule has been ruptured or penetrated, the lens often swells rapidly; and even if the tension of the eye is not abnormally increased by such swelling, as it frequently is, the presence of the swollen cortical lens substance in the aqueous chamber causes great irritation and delays healing. Even in the presence of marked inflammation in such cases it is better to extract the lens, and such treatment frequently causes the irritation to subside, and brings about prompt healing. Such treatment is accomplished with a minimum of risk by the linear method of extraction.

Shrunken Lenses, Membranous Cataracts, Etc.

This method is indicated for the extraction of shrunken, membranous cataracts, such as one sees after traumatism of the lens where much of the cortical substance has been absorbed, but the capsule and some of the cortical substance remain, and there may be calcareous deposits in the mass that blocks the pupil. Such cases resist all attempts at discission. There is frequently adhesion of the iris and a preliminary iridectomy may be necessary before the attempt is made to remove the cataract itself.

Again this method is one of choice for the removal of such membranous cataracts or rather "after cataracts." that resist efforts of discission. Such a membranous cataract is usually a thickened, tough capsule with possibly some calcareous deposit, that remains after the ordinary extraction of senile cataract. It will either have to be removed entire, or if it is adherent to the iris, will require to be divided with capsule scissors introduced through the linear corneal wound into the anterior chamber. Finally, this method is the one that should

be followed, because of its greater safety, in the extraction of the lens in those cases of high myopia where removal of the lens is advisable, provided the individual is of a suitable age.

Technic.

Let us now consider the method of procedure and the technic to be followed.

It almost goes without saying that before the treatment is started the same precautions must be taken that one would observe in any operation in which the eyeball is to be penetrated or opened. Smears and cultures from the conjunctival sac should be studied to determine whether it is free of micro-organisms that would infect the wound or the interior of the eye, and if such organisms are present the operation must be deferred until it is proven that the conjunctival sac is surgically clean. Approved methods of sterilizing the field of operation must be followed, as in any operation on the eyeball. Local anesthesia, preferably from 4% cocaine solution, is usually sufficient, but in young subjects and especially nervous children, general narcosis may be necessary. The pupil should invariably be dilated with atropin before proceeding with the operation.

In any cataract suitable for this form of treatment as has been already indicated if the lens is entire, there should be performed a preliminary discission of the capsule which should be free enough to insure swelling of the lens substance and its ready separation from the capsule. If, however, we are dealing with a traumatic cataract in which it is evident the capsule has been ruptured, this step in the treatment will be unnecessary.

A variable length of time after the discission, when it is clear that the lens is swollen and has become pretty generally opaque, it will be proper to proceed with the extraction. This may be one day or it may be several days, but it is better to extract the lens before there are any pronounced signs of reaction or any increase of tension of the eyeball. Naturally these signs would be indications for prompt removal of the lens. However, in young subjects the eye seems to tolerate an increased tension lasting several days without danger, and this tension may subside under administration of myotics, hot applications and dionin, so that the operation may be done under more favorable conditions.

A broad keratome should be used so that the incision in

the cornea may be made of a proper length without the point penetrating too deeply into the anterior chamber. If the patient is young, and it is evident that the lens mass is pretty well softened and pulpy, the incision need not be larger than 5 to 7 mm. while if there is any suspicion of the existence of a small nucleus in the lens or indication of necessity for manipulation within the anterior chamber for removal of a calcareous membranous mass, the incision had better be 8 to 10 mm. in length.

As mentioned before, my preference is to make the incision just at the anterior edge of the sclero-corneal margin and not in the clear cornea as recommended by some authorities, and unless there is some contraindicating reason, the incision should be made at the upper edge of the cornea. The eye is held with fixation forceps, and as in the incision for iridectomy, the blade of the knife is held at almost a right angle to the surface of the cornea until the point is seen to have entered the anterior chamber and then its direction is changed so that the plane of the blade will be parallel to the plane of the iris. This should be accomplished without any hesitation in the onward course of the knife, so as to avoid the premature escape of the aqueous that would tend to throw the iris against the point. The cut should be made rather deliberately to keep the blade in the proper line, and when it is completed the knife should be withdrawn rather quickly but not with a jerk. If the iris prolapses into the wound it should be gently replaced. A small, flat, grooved spatula about 3 or 4 mm. in width is then introduced into the anterior chamber with the left hand of the operator, while with his right he gently strokes the cornea with the rounded surface of a cataract spoon to force the pulpy masses of lens substance through the wound along the grooved spatula. By slightly tilting the latter, the lips of the wound are separated so that the extraction is facilitated. During the extraction, if the eye becomes unruly an assistant may hold it with the fixation forceps. Care must be taken that the end of the spatula is not directed backward so as to penetrate the posterior capsule or the suspensory ligament.

If the iris persistently refuses to remain in the chamber, a small iridectomy may be necessary. If all or most of the lens substance does not escape with this maneuver one had better irrigate the anterior chamber with sterile normal salt solution rather than make too strenuous or determined attempts to get

small masses that may be in a part of the chamber some distance from the incision. For this purpose I use an irrigator of the Lippincott model, having a cannula tip mounted in a handle, so that the flow of fluid can be easily controlled. The little stream can be directed into all parts of the chamber and the outflow of lens debris can be facilitated by keeping the lips of the wound separated slightly with the grooved spatula. I regard the irrigation in these cases a most valuable adjunct and usually less traumatising than the manipulation with spoon and spatula. At the completion of the operation atropin should be instilled and the eye closed with the customary dressing. Barring accidents or some unforeseen occurrence, the healing is usually prompt and uneventful.

I should say the method of irrigating the remains of the cataract from the anterior chamber is decidedly preferable to the method at one time in vogue of aspirating with some form of suction apparatus as was practised years ago by such eminent operators as Teale, Lawson and Bowman.

With the combined irrigator and aspirator which withdraws the fluid from the anterior chamber as rapidly as it is introduced I have had no experience.

Membranous Cataracts.

In the treatment of shrunken cataracts with thickened capsule, or tough membranous cataracts that have resisted dissection the method of procedure is somewhat different. A large keratome with a longer blade is desirable. The incision in the cornea is made as described before, but after entering the anterior chamber the point of the knife is thrust through the membranous cataract at the lower part of the pupil near the margin of the iris and by slight side to side motion of the tip of the blade a rent is made in the capsular membrane. The knife is then withdrawn. A trained assistant should then hold the eye with fixation forceps while the operator with left hand passes a small blunt Tyrrell hook into the anterior chamber and through the rent in the lower part of the capsule. Hooking on to the edge of the membrane, he gives the instrument a half turn by revolving it in his fingers and so secures a firmer hold. Then by gentle traction and slight lateral movements the membrane is drawn into the corneal wound. Occasionally if adhesions are not firm the membranous mass can be completely removed from the eye, but more frequently when drawn out of the wound it will be necessary to cut it with scissors held

ready in the right hand, exactly as one would make an iridectomy. The remaining part of the membrane is then allowed to fall back into the anterior chamber, but if the maneuver has been successful, that part of it that blocked the pupil will have been removed. Naturally there is danger of vitreous prolapse, to avoid which the patient must keep the eye still and the assistant must hold the eye skilfully and relieve any pressure of the speculum upon the eyeball. General narcosis may be necessary in young subjects.

This method of operating on these difficult cases is attributed to Agnew by Beard, and it is possible by it to obtain brilliant results as I have experienced in a number of cases.

Summary.

To briefly summarize the indications for and the advantages of this method we may say that it is the operation for extraction of soft cataracts in persons under the age of 35 years and even older. It is most satisfactory when preceded by a free dissection of the capsule. It is the operation for traumatic cataract in persons not older than 40 years. It is an excellent method of operating on intractable, thick membranous cataracts.

The incision being comparatively short, straight and smoothly cut with a lance heals more quickly because of perfect coaptation and chance of infection is less. In many cases it is better to operate by this method for traumatic and needled cataracts than to wait for tedious absorption of lens substance and its attendant dangers.

EXPERIENCE IN CATARACT OPERATIONS.*

BY

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After 26 years of experience in cataract operations I desire to give some of the results of the experience to our Society with the hope that some points may be of aid and interest, and to obtain an expression of views from other members.

The first important steps with cataract patients are to make a thorough examination of the eye-balls, the lids, the age, and the general health.

With a number of aged patients, whose vitality is usually

*Read before the Society of Ophthalmologists and Otologists, Washington, D. C., Jan. 21, 1916.

low, I have found a chronic conjunctivitis and experienced difficulty in getting the lids in proper condition for an operation.

At times you will find daeryocystitis and pus pockets which of course render the operation much more serious.

If there is any secretion of any nature it should first be examined to ascertain what you have to deal with.

The patient should be taught several days before operating to look as directed. It is not very pleasant when beginning to operate to ask the patient to look down and have him do just the opposite as is often the case.

A hospital is usually the best place to operate, but not so with very old people who can have members of their family near by and who have a comfortable bed and have grown used to certain conditions at their homes, as a change to a hospital makes them more or less apprehensive and restless.

In the majority of cases on the night before the operation the lids should be irrigated with boracic acid solution and a drop of argyrol 20% or White's ointment (corros. sub. and vaselin 1 to 3000) applied between the lids. In the morning of the day of the operation the lids should again be irrigated with boracic acid solution.

It is not advisable to use the White's ointment on patients who have a sensitive mucous membrane and skin. Twice during the past year I have had to defer the operation until the lids had recovered from an acute attack of conjunctivitis brought about by the use of the White's ointment. I find that argyrol 20% will take the place of the ointment.

Just before the operation cleanse the face with solution of green soap, clean around the eye and between the lids with solution corrosive sublimate, 1 to 5000, and irrigate the lids with boracic acid solution. Apply a few drops of 4% cocaine solution, afterwards 1 drop of solution adrenalin chloride, 1 to 1000. Follow this with 1% holocain solution every three minutes until three applications are made, and the eye is then ready for the operation.

After adjusting the speculum I have the patient look up, and I catch the conjunctiva just below the cornea and slightly to the side of the lower vertical axis of the eye-ball with Zeigler's forceps made without a clasp. Direct the patient to look down, then with a cataract knife the puncture is made 1 mm. from the horizontal axis and 1 to 1½ mm. below the limbus and counter-puncture the same.

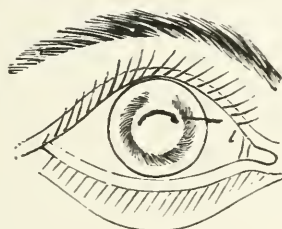
The incision should be made just below or at the limbus if the anterior chamber is very shallow to prevent the iris getting in front of the knife.

Let the incision be made steadily and go very slowly in order to prevent the escape of the aqueous fluid from the anterior chamber.

If an incision is made 1 to $1\frac{1}{2}$ mm. below the corneal margin you will have enough of the conjunctiva to heal quickly and prevent any infection. Before the section is completed the blade can be turned to cut a little more of the conjunctival membrane, if advisable.

To make an extra large flap is ideal, but at the same time there is danger in making the sclerotic too thin. I have seen a case following an operation where a spell of coughing caused a hernia of the sclerotic.

The flap is apt to get between the lips of the corneal incision



Showing Iridectomy and Curved Incision in Lens Capsule.

and separate the wound, and if there is an escape of the vitreous there will be a greater chance for infection and the wound is prevented from healing.

It is advisable to perform an iridectomy unless the patient is under 55 years of age, although I have had good results without iridectomy with patients over 60.

Some of the best results I have had with elderly patients have been obtained by performing a preliminary iridectomy from one to three months before removing the lens.

It is not necessary to make a large iridectomy unless the eye has a tendency to glaucoma.

I generally use the capsule forceps in cataract operations unless the patient is given to squeezing the lids together.

After you get a piece of the capsule out with the forceps, and the lens does not come out with a slight pressure below, make a circular incision with a cystitome over the top of the capsule.

If you get out a good size piece of the capsule you will not be called on to perform the secondary operation so often with the needle.

It is important to syringe the anterior chamber thoroughly with a normal salt solution, as this not only washes out any remaining cortical substance but also removes any blood clots which would be apt to give trouble.

If the patient begins to be restless I remove the speculum before washing out the anterior chamber.

After seeing that the iris and the corneal flap are in their places, irrigate the lids with a boracic acid solution and place in the inner canthus a small amount of White's ointment and also put it over the surface of the gauze eye pad. This pad is made of gauze with cotton in between and held in place with isinglass adhesive strips, and over the pads a double tie bandage and Ring's mask are placed for protection.

I generally drop in one drop of 1% solution atropin sulphate after the operation and nearly every day thereafter for five or six days. On the second day I examine the eye by lifting the bandage, and if there is no secretion I do not open the lids until the third day.

When you find secretions irrigate with solution of boracic acid and drop in the eye one drop of 1% solution atropin sulphate and one drop of argyrol 20%. At times it is advisable to use 10% boracic acid ointment between the lids or ichthyol 5%, or corrosive sublimate ointment 1 to 10,000 may be used. Atrop. sulph. 1% ointment is frequently applied between the lids once daily instead of atrop. sulph. in solution.

The patient should remain on his back in bed about 24 hours, or may be permitted to turn on the side without moving the head unless it be very slightly. I often tell them they can move the body in the same way that a snake does but not the head—this applies to the restless ones.

The third day they may be permitted to be propped up with pillows or back rest; the fourth day they may sit in a reclining chair one or two hours, and on the fifth day they may walk around after putting on dark glasses.

Every cataract patient should have a trained nurse or some very capable person in constant attendance at least four days and the attendant should be impressed with the necessity of carrying out the operator's instructions.

The diet should be liquid for 36 hours, then soft for two

days, and afterwards good plain food according to the age and general health of the patient.

I will now give the results of seven operations for cataract during the past year:

(1) Mr. W., 79 years of age. An examination revealed cataract in each eye and chronic conjunctivitis of the lids. R. V. = count fingers at one foot; L. V. = $4/200 - 1.50 = 15/200$. After treating the lids and getting them in fairly good condition I performed an operation on the right eye on February 20th. The lens was large so I made the incision to include half the cornea. After the iridectomy was made the capsule forceps were used and the entire lens was removed. The patient rested in bed two days, and on the third night, owing to some negligence in permitting the furnace fire to go out, he contracted bronchitis and had spasms of coughing. The following day I examined the eye and found that a blood vessel had burst under the conjunctival membrane of the upper lid which was much swollen and the corneal flap was pushed up. At first I thought the sight was gone, but after applying drops of holocain 1% and solution adrenalin chloride 1 to 1000 the blood disappeared the following day, the corneal flap went into its place and healed. The patient had a weak heart and on one night came very near dying. He remained in the hospital one month. The upper portion of the cornea is cloudy and opaque but the cornea over the pupil is clear. With a corrective glass the vision = $20/200$. I think a needle operation will give him still better vision.

On the fifth day a most persistent catarrhal inflammation started with the lids of the left eye. I had the nurse use argyrol 20% and irrigated with solution of boracic acid every two or three hours, and this failing to remedy the condition, I used solution corrosive sublimate 1 to 5000 and saturated solution boracic acid equal parts with excellent result and have found this combination entirely satisfactory in other chronic cases. Since the operation his health has improved and he is in a better condition than for several years.

(2) Mrs. H., age 42. On examination found cataract in each eye. R. V. = $20/200$ W. + 0.50 AX. 90 = $20/80$; L. V. = sees light from darkness. She had a high degree of exophoria with left eye and growth on lower lid, and also complained of neuralgia over the left eye. She is rather inclined to a hospital habit, as already she has had two abdominal opera-

tions and has a chronic intestinal trouble that a number of physicians have been trying to relieve. I performed an operation on the external muscle and removed the growth. When the membranes healed I performed the cataract extraction without iridectomy. In two weeks she was out of the hospital, and after one month with $+12.00$ lens her vision was $20/30$. At the expiration of the sixth week, I needled the capsule and the vision increased to $20/20$ plus, and now she can read the finest Jaeger test type with $+15.00$ lens. The night before operating I applied White's ointment and in the morning I discovered a dermatitis. In order to relieve this condition I applied ichthyol ointment 10%, but a delay of several days was necessitated before I could operate. After the operation ichthyol ointment was used instead of the corrosive sublimate.

I operated on this patient's mother 17 years prior. She was 63 years of age, and had dacryocystitis with each eye after the operation. In her case I used 1% yellow oxide mercury ointment with good result, the wound healing well and she could see to read with comfort.

(3) Mr. Blank, age 77; on examination found cataract in each eye, conjunctivitis, and skin broken out with hives. R. V. = $15/200$ W. — $4.50=20/60+$; L. V. only distinguishes light from darkness. I sent him to a hospital on April 20th, and treated the eye. The following day about an hour before the time set for the operation he came to my office and said he could not stand the noises at the hospital. I performed the operation at his home. He did very well and in six days was walking around the room with dark glasses. On the seventh day I noticed redness of the eye-ball and he complained of pain. Solution of atropin sulphate and hot applications were ordered. When I went into the hall I asked the nurse if she knew of any cause for such a change in the condition of the eye from the day previous. She replied that she had some trouble with him and slapped him on the side of the face. An examination of the eye a week later showed organized blood clots in the anterior chamber. The eye was treated about two months, and after I performed a needle operation his vision was $20/30$, after the second needle operation his vision was $20/20$, and now he can read the finest print on Jaeger's test type. The vision of his right eye has improved with a glass to $20/40$ owing to the improvement of health. He has some trouble with double vision when wearing glasses. It not in-

frequently happens that patients have trouble with double vision when the vision of the eye which has not been operated upon is 20/30 or 20/40, but very little trouble when the vision is 20/20 or 20/200.

(4) Mrs. H., 79 years of age; on examination found cataract in each eye. R. V. could distinguish light from darkness; L. V. = 6/24. I performed an operation at her son's home on May 30th. On the third day the bandage was removed from one eye, fourth day bandage removed from the other eye, fifth day she was walking around with dark glasses, and on the sixth day she went down two flights of stairs and ate dinner with the family. In three weeks she was tested for glasses at my office,—vision 20/20 with plus 12.00 lens and could read the finest of Jaeger's test type with plus 15.00 lens. She has very little trouble in wearing a cataract glass with the proper correction glass for the other eye. On account of the quick recovery at her advanced age I regard her as my star patient.

(5) Mr. B. On examination found cataract in each eye. R. V. = 20/100; L. V. = 20/200; complained that he could not see to read. I made a preliminary iridectomy on left eye in June, and removed the lens in the following September. The cataract came out and left a layer of cortical substance at the outer section of the capsule and some cloudiness of the capsule over the pupil. I syringed the anterior chamber with normal salt solution. He was treated with atropia sulphate and hot applications one month. When he came to my office for glasses I found there still remained a little cortical substance, but the center of the capsule was clear. With distance glasses his vision was 20/20 and with plus 15.00 lens could read the finest print on Jaeger's test card.

(6) Mrs. H. age 87. On examination I found cataract in each eye. She complained that she could not see to read and was very anxious to see the faces of her grand-children. She has had dacryocystitis of the right eye about 30 years. In the left eye was a slight catarrhal conjunctivitis. After treatment about three weeks I performed a preliminary iridectomy on the left eye. In December I removed the lens. A month before removing the lens I thought the lids of the left eye were ready for the operation, but preliminary thereto White's ointment was used and the bandage applied. When I removed the bandage there was considerable discharge of pus from the lids.

After treatment with argyrol and equal parts of corrosive sublimate 1 to 5000 and saturated solution of boracic acid the eye was in condition for the operation. Ichthyol 10% was used between the lids at the inner canthus and all over the lids to prevent any infection from the dacryocystitis of the right eye. The corneal wound healed without any infection. The discharge of pus from the lachrymal sac of right eye started up on the third day, but soon improved after the bandage was left off. Before the operation I explained that an infection might occur and that there would be trouble, nevertheless she said go ahead with the operation. The time is not yet ripe to test the eye for permanent glasses, but from general appearances I believe she will be able to read without any trouble and also readily see her grand-children. Her physician in the town where she lives in West Virginia writes that he gave her a distance glass, and will soon test her for a glass to read with.

With the exception of one patient who was 89 years of age this was the oldest patient I ever operated on. The one who was 89 said she could now see the leaves and the birds and would be perfectly happy if she could take a horse-back ride.

(7) Mr. Z. age 32, Bulgarian, does not understand English language. Had a traumatic cataract of left eye. Injured last January by a splinter of wood at a lumber camp. Opacity of cornea, all of upper section of cornea, and adhesions of iris to cornea. L. V. = could tell if hand was held between the eye and a candle light. R. V. 20/20. Operated in September and in six days he left the hospital. After one month, with glass, vision was 20/40. With a needle operation I believe he will have 20/20.

Of the seven cases three of them did not have any astigmatism after seven months and had 20/20 vision with a plus glass. One only had 0.75 astigmatism.

When a patient has cataracts and the vision of both eyes with correction is not more than 20/100, and is in a healthy condition and is desirous of better vision to read I will perform a cataract extraction. When the cataract is not ripe I generally perform a preliminary iridectomy one to six months before removing the lens.

AN ORBITAL ENDOTHELIOMA.

BY

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MEDICINE.

Introduction.

A great variety of tumors are reported as occurring in the orbital cavity, but there is none that gives a history of more than



No. I. Before Operation. March 6th, 1905.

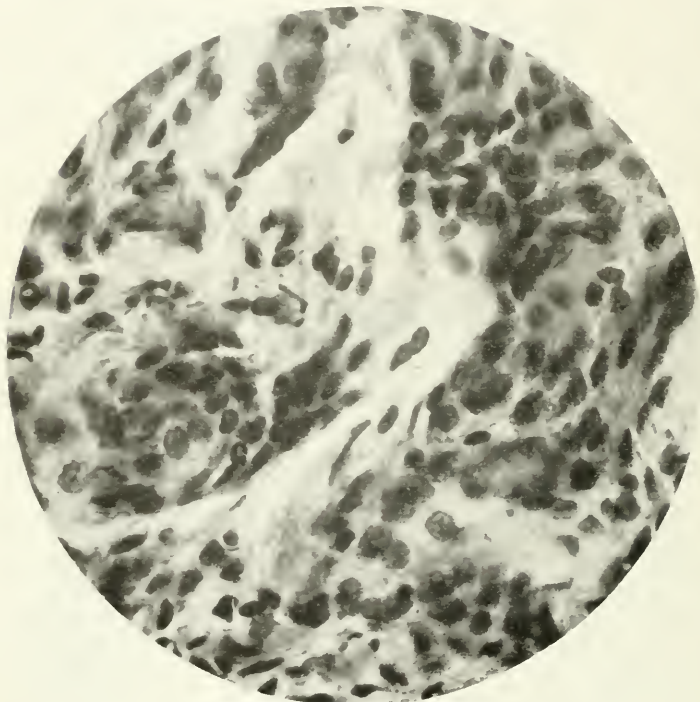


No. II. Before Operation in October, 1915.

twenty years' growth. Reports of cases of endothelioma of the orbit are extremely rare. The original report of this case was the subject of an entrance thesis to the Chicago Ophthalmological Society, and was published in the *OPHTHALMIC RECORD* of May, 1907. On February 20, 1911, I again had the pleasure of showing the patient before the Chicago Ophthalmological Society. The report of the same may be found in the records of the proceedings of the society of the above date.

History.

Mrs. F., Age 45, widow. Family history negative. Has always been and is at present in good health. September, 1915, was twenty-one years since the patient noticed a turning out of the left eye. The patient states that at that time the eyesight was good. The eye commenced to show protusion (proptosis) three years after the appearance of the strabismus. The vision at this time entirely disappeared. The patient was ad-



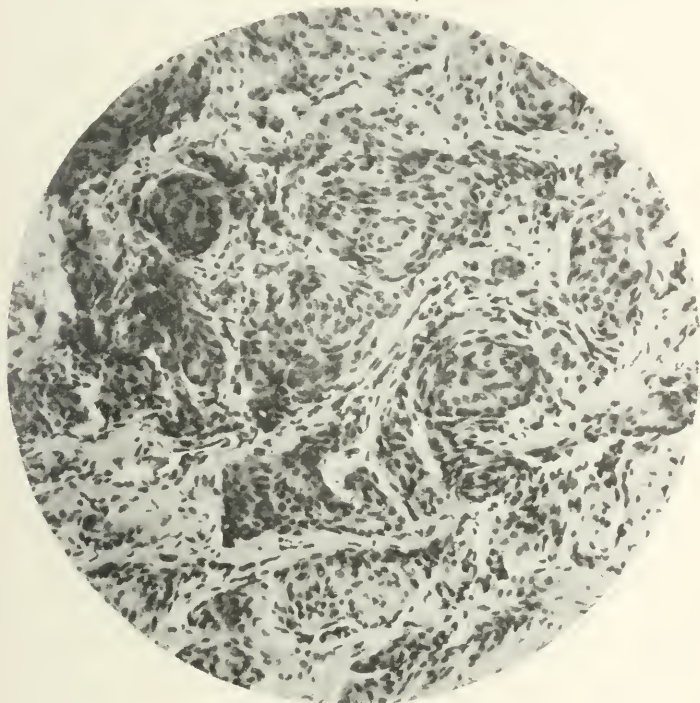
No. III. March, 1905. 600 Diameters.
Hemangioendothelioma perivasculare.
(Prof. Zeit.)

vised at that time to have the eye taken out but declined. Nothing was done in the way of treatment for the next three years. On September 26, 1904, she came to the clinic at Northwestern University Medical School.

Examination:—September 26, 1904.

Vision, R. 20/20. L. Blind. The left eye protrudes about three-fourths of an inch beyond the orbit, the lids covering and protecting the cornea nicely. The lids are swollen, which the patient states is worse in the morning. There is loss of motion

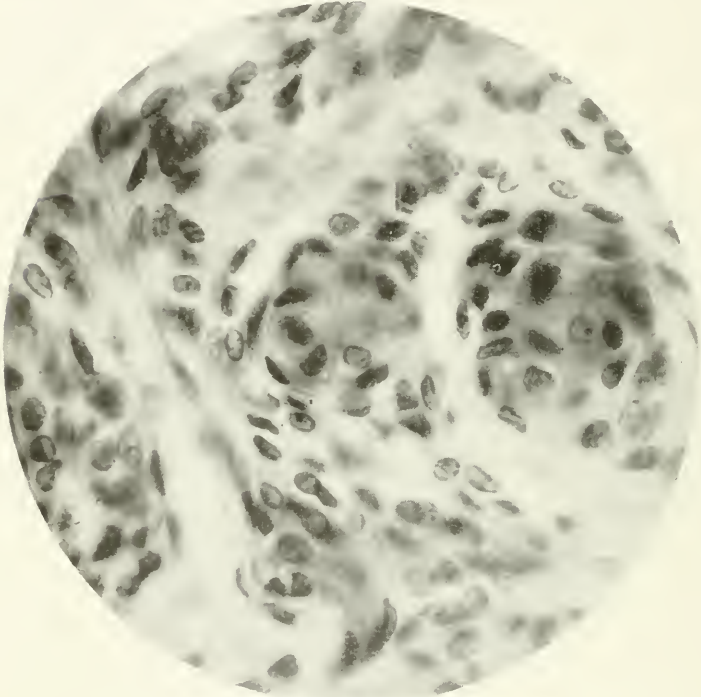
of all the muscles. A divergent squint is present. The blood vessels, both of the lids (conjunctival surface) and globe are enlarged and engorged, especially the veins. The cornea is clear, the pupil slightly larger than the right, and in outline is round and regular. The media are clear. The examination of the fundus shows the disc elevated and best seen with a + 4 D. The outline of the papilla is indistinct. The tension is normal; on palpating toward the inner side of the upper and lower lids



No. IV. March, 1905. 200 Diameters.
Hemangioendothelioma perivascular.
(Prof. Zeit.)

no distinct mass can be found. The structures are soft and the orbital cavity can be easily outlined. The Kroenlein operation was advised. The patient consented and entered the hospital on March 6, 1905, and was prepared for operation and operated upon the following day in Doctor Schroeder's clinic. Kroenlein's method was used. An incision, slightly curved, was made, extending well up into the temporal region, down by the outer orbital wall, back in a horizontal direction toward the ear. The periosteum was detached up to the outer wall.

The bone was separated with a chisel from within the orbital cavity, the soft structures, eye and tumor, being retracted with a spoon retractor. This wedge-shaped bone was left attached to the skin, making an osteoplastic flap. The muscle funnel was now entered and by blunt dissection the tumor removed piecemeal, which was found to completely fill the muscle funnel. After removal, all bleeding was checked, the wedge-shaped piece of bone replaced, the skin sutured and a dry



No. V. 600 Diameter. (Picture by Harmon.)
Perivascular endothelioma.
(Dr. M. Herzog.)

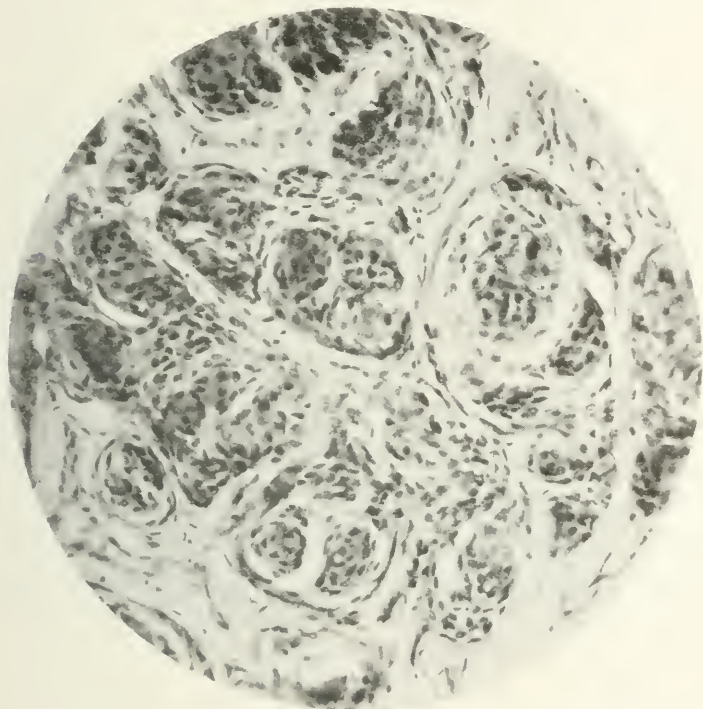
dressing applied. Examination the following day showed a very severe reaction, ecchymosis extending across the bridge of the nose into the orbital tissue of the other eye, almost closing it, and extending into the scalp down to the inferior maxillary bone on the operated side. The cornea was cloudy, conjunctiva chemotic, lids very much swollen. The globe had not at this time retracted. In a few days, under moist dressing, the swelling disappeared. Ecchymosis did not entirely disappear until four weeks later. The cornea cleared in the same length of

time. The Kroenlein incision healed by primary intention.

The patient was examined on August 23, 1905, May 4, 1906, April 8, 1907, and November 9, 1910. The growth increased in size from May 4, 1906, to November 9, 1910, to about the same size as when the patient came to me before the Kroenlein operation.

General Health.

This is very good. Since being operated upon the patient



No. VI. Diagnosis, October 23rd, 1915. Perivascular Endothelioma.

Dr. M. Herzog.

Diagnosis, October 23rd, 1915. 200 Diameter.

gave birth to three children, all living and well. In July, 1910, she fractured her tibia which healed without any complication. The protruding eye has never caused any pain. On November 22, 1910, the patient was examined for evidence of metastasis. The report was negative. On October 20, 1915, the patient entered St. Anthony's Hospital, and on the following day an exenteration of the orbit was performed. The tumor mass was very adherent, especially so at and around the orbital foramen and the external orbital wall where the Kroenlein bone flap had

been made. The bleeding was checked somewhat by means of hot sponges. The periosteum was removed and the whole of the orbital cavity cauterized (Pacquelin cautery) and packed with gauze. Healing is taking place.

Diagnosis.

The Microscopical (See Photographs), diagnosis made March, 1905, by Dr. F. Robert Zeit was Hemangioendothelioma perivascular. The specimen taken at the operation of October 23, 1915, was reported by Dr. M. Herzog as perivascular endothelioma. The tumor has the same histologic structure,



No. VII. Globe and tumor mass. October 23rd, 1915.

according to his statement, it had ten years ago.

Conclusions.

The conclusions to be drawn from this case are, 1st, Endotheliomata of the orbit are of slow growth. 2nd, Orbital endotheliomata are painless. 3rd, They are prone to return at the site of operation. 4th, The neighboring lymph nodes are not affected early.

A mass meeting was held in Chicago on March 31 under the auspices of the Illinois Association for the Prevention of Blindness. Drs. E. V. L. Brown and Thomas A. Woodruff of Chicago are on the executive committee.

REPORTS OF SOCIETIES

WILLS HOSPITAL OPHTHALMIC SOCIETY.

McCLUNEY RADCLIFFE, M. D., CHAIRMAN.

DECEMBER 6, 1915.

Congenital Cataract.

Dr. S. D. Risley recited briefly the history of four cases of reputed congenital cataract, present in both eyes of each patient, which had been assigned to his service since the first of October. These cases were all in the wards and under treatment at the same time. The youngest patient was seven, and the oldest fourteen years of age. Two of the cataracts were of the lamellar, or zonular type. The other cases presented posterior capsular opacities, with wheel-like radiations of opacity in the posterior cortex. One of the zonular cataracts was in a girl, both of whose parents were deaf mutes, but no hereditary cataract could be traced. Dr. Risley thought it unusual to have such a group under observation at once. Two of the cases were exhibited, the other two having been discharged with clear black pupils and good vision. The cases were presented to illustrate the speedy results reached by the surgical procedure adopted. Dr. Risley spoke of the many weeks of hospital life required by the repeated discissions which, in common with his colleagues, he had formerly employed. For many years he had, instead of repeated needlings, to secure the slow absorption of the opaque cortex, made a vertical incision of the capsule from the lower margin of the dilated pupil to the upper margin; and this was immediately followed by a deep incision along the same line in the cortex of the lens. Two to four days later, a keratome was introduced at the upper limbus, and carried deeply into the now flocculent and opaque lens, cutting across the line of incision made in the capsule at the first operation, and as near as possible to the upper margin of the dilated pupil. The keratome was then partially and slowly withdrawn, the back of the blade pressed backward against the iris and causing the wound to gape, at the same time preventing the prolapse of the iris into the wound, but allowing the soft cortex to escape, at the will of the operator, over the anterior surface of the blade. If necessary, slight pressure could be exerted with the fixation forceps from below.

In each of the posterior capsular cases, an additional capsulotomy for the posterior capsule had been required; but in

all the cases a clear black pupil had been secured in from four to six weeks. In one of the cases there was still some cortex remaining, but disappearing five weeks after admission to the hospital. He thought that this procedure diminished very markedly the hospital days, and avoided the danger of repeated dissections; also the recurrence of the inflammatory reaction, so frequently occurring in the presence of cortical debris in the anterior chamber. He had seen many instances of uveal disease after dissections, many of which he thought were not to be explained by the mechanical presence of the fragments of cortex nor by increased tension, but seemed to be due to some toxic properties of the cortex. He felt that this was certainly true of some varieties of cataract—the Morgagnian cataract, for example.

DISCUSSION.

Dr. Posey commended Dr. Risley's method of removing the lens matter by expressing it shortly after a preliminary needling. He had himself followed this method in a number of cases. He said that as it is usually desirable to give an anesthetic of some kind in needling the eye of a young child, any procedure that diminishes the frequency of such anesthetizations is of value. He uses a straight spatula for the removal of the soft lens matter, and makes his incision in the horizontal plane of the cornea, 2 mm. from the limbus. The class of cases referred to by him before a recent meeting of the State Society, in which the capsule of the lens is dense and often the seat of calcareous change, is best treated by depression of the opacity into the vitreous by the knife-needle, such a procedure giving more hope for vision than unsuccessful attempts to move the calcareous mass, either by the knife-needle or by the de Wecker scissors.

Dr. Schwenk stated that he makes a crucial incision in the lens capsule and, after the lens matter becomes semi-opaque, he cures the lens in a similar way to the method described by Dr. Risley. Loose cortical matter, when not in the capsule, acts as an irritant; and the sooner it is expressed, the more quickly will the eye get well. Dr. Schwenk thought that Dr. Risley deserved to be complimented on obtaining such fine results in so short a time.

Dr. Zentmayer said that when so experienced and skilful an operator as Dr. Risley was unfortunate enough to get a slight prolapse in one case and a drawing up of the iris in another,

he, himself, would adhere to the safer procedure of discission. While Dr. Zentmayer thought it true that this method is slow, he said that, aside from the infinitesimal danger of infection, it is safe. In most cases two discissions, supplemented in some cases by a capsulotomy, are sufficient.

The Influence of Alcohol on the Operation for Cataract.

Dr. William Campbell Posey said that doubtless the most common influence is that which exerts itself on the minds of patients about forty-eight hours or later, after the removal of the lens; for while he did not agree with Martin, the celebrated French observer, that alcohol is responsible for most of the cases of delirium after cataract operations, he thought that it accounts for quite a number. He wished, however, to speak on the influence of the abuse of alcohol in setting up active uveal changes some days after the operation, in eyes in which healing had been prompt and without complication. He referred to the case of a man seventy years of age, in whom the vitreous became fluid and filled with a flocculent material, in conjunction with all the signs of an acute uveitis, four or five days after the operation. In another case, that of a lawyer, aged seventy-six years, also a free user of whiskey, a form of plastic irido-cyclitis was set up about four days after the operation. It yielded very stubbornly to treatment. Although in neither of these cases did the urine show positive evidences of renal disease, Dr. Posey was convinced that subtle changes must have occurred in the kidneys, as well as the liver, in consequence of the prolonged abuse of alcohol, which had interfered with metabolism and had originated the inflammatory changes in the eye following the operative procedure. Such cases do best on salicylates, moderate diaphoresis, atropin, dionin and ice, locally. Later, some form of iodide is of service.

DISCUSSION.

Dr. Risley was much interested in the cases reported by Dr. Posey. He said that it was doubtless true that the habitual use of alcohol in any form reduces the ability of the organism to resist disease or to repair injury; as after a surgical procedure. The same, he stated, is true of ether, chloroform or opium. All have seen how rapidly apparently strong, vigorous men that drink alcoholic beverages freely, live sumptuously every day, and are clothed in purple and fine linen, may succumb to disease; to pneumonia, for example. Their

powers of resistance and repair are disabled. Therefore, the prognosis after surgical interference in such individuals is not good, as Dr. Risley had had many opportunities to observe.

Dr. Burton Chance remarked that he supposed that there is no condition so disappointing as to have inflammation occur after clean operations in presumably robust individuals, as had occurred in the two cases presented by Dr. Posey. Such an occurrence leads to the consideration of the peculiar condition excited by operation. Such individuals have been immune from all disease since childhood; and this being their first illness, the cataract operation develops a weak point. In such persons as Dr. Posey's patients, alcohol had served as a "preservative"; and recovery from the effects of traumatism requires a continuance of its administration. From his own observation of the technique of a number of careful surgeons Dr. Chance does not look upon such post-operative inflammation as of septic origin. On the contrary, in the class of cases under discussion he is himself inclined to the belief that in the disintegration of lenticular particles, noxious compounds are created, which, together with the presence of the particles themselves, excite inflammation in the uveal tissues. This process would confirm the supposition that such inflammatory reactions are endogenetic, rather than exogenetic, in origin.

Hyaline Degeneration of the Choroid.

Dr. Burton Chance briefly reported a case of hyaline degeneration of the choroid, from Dr. Schwenk's service. In the absence of the patient, a girl of nine, Dr. Chance showed a water-color sketch of the eye-ground. A remarkable feature is the play of reflexes, he said, in a negroid fundus. The disk has much opacity on its surface, but does not appear to be swollen. Scattered throughout the entire fundus, but more numerous in the temporal region, are small globular and reniform spots beneath the retina. Certain of the temporal vessels are more sharply outlined than in the normal eye. The fundus presents no signs of active inflammation; the areas are discrete and in no region show coalescence. The peripheral field of vision shows marked contraction, but no localized scotomata. The left eye seems normal in all respects, and the fields are ample. The child is an unusually intelligent Russian; but from her mother no history could be obtained pointing to a cause for these unusual ocular conditions.

DISCUSSION.

Dr. Zentmayer said that Dr. Chance's case was similar to one that he had recently seen in consultation. A woman, 30 years of age, presented in each fundus small, bright, but not brilliant, yellowish dots, grouped about the macula; more, however, towards the nasal than the temporal side of the fovea. Similar dots were scattered throughout the fundus, up to the region of the ora serrata. In one eye there was a small patch of congenital atypical pigmentation of the retina, and also a small spot of choroidal atrophy. There was a low grade night-blindness. Light sense, tested by Dr. Langdon, on the Langdon photometer, showed the minimum of normal. The visual fields were contracted to within 40 degrees of fixation for form, and 20 degrees for red. The case seemed to belong to the class of retinal degenerations without pigmentations.

Result of a Heisrath-Kuhnt Operation.

Dr. William Zentmayer exhibited this case to show the destructive effects of grattage and the result from combined excision and resection. As the result of grattage, broad bands of conjunctiva stretched between the lids and ball, making it difficult to secure sufficient conjunctiva to take the place of the excised tissue in the Heisrath-Kuhnt procedure. Ten days had elapsed since the operation, which had been done because of repeated ulceration of the cornea; and already the ulcers were healed. The patient stated that the eyes were more comfortable than they had been for years. On the one side, there had resulted a widening of the palpebral fissure; whereas, on the other side, there was a slight narrowing of the fissure.

Result in an O'Connor Operation for Squint.

Dr. Zentmayer showed this case to demonstrate a good result obtained in nearly every case that he had operated on by this method. The case was one of esotropia of 45 degrees, in a girl 8 years of age. It was only twelve days since the operation, the stitches having been removed two days before; and the patient showed about 5 degrees of over-correction. Both externi had been advanced, but no tenotomy of the interni had been made.

DISCUSSION.

Dr. Posey said that he had done the O'Connor operation upon ten patients or more and had had great reaction follow it in two cases, the tissues at the site of the advancement having

sloughed three or four days after the operation. While the results in some of the cases were extremely good the amount of reaction obtained in two cases caused Dr. Posey to reserve his opinion regarding the value of the method until he had had further experience with it.

Dr. Chance said that the O'Connor operation, while still on trial, has amply demonstrated its efficiency. In his own experience of four cases, he had been impressed by the mildness of the reactions. In each instance, the patient had been able to leave the hospital or his house by the end of a week. The total effect of the advancement had been most satisfactory in each case. Dr. Chance had not seen ulceration, necrosis, or any other disturbance of the tissues about the knots; but in his first case, a cyst was noticed at the lower angle of the conjunctival scar. This cyst, he assumed to be in some way connected with the dissolution of the catgut, although it might have been caused by the inclusion of the conjunctival tissues within the wound. He snipped it; and after an interval of several months, it has not reappeared.

J. MILTON GRISCOM, M. D.,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

E. R. NEEPER, M. D., PRESIDING.

JANUARY 15, 1916.

Diabetic Retinitis.

Dr. E. R. Neeper presented M. V. aged 20. First seen September 24, 1910, with a history of photophobia and simple conjunctivitis past two weeks. Eyes ache after reading. Choroidal disturbances suggestive of salt and pepper fundi of lues. Correction of plus 0.50 = plus 0.50 ax. 90 gave questionable relief and did not increase vision which was O. D. 20/20-4 and O. S. 20/15-4. Was seen again September, 1911, when the fundi were more pronouncedly disturbed and a slightly changed refraction, with vision O. D. 20/60 plus 4 and O. S. 20/80 plus 2.

Next seen Jan. 13th, 1916. Fundi appear somewhat granular, choroidal vessels abnormally visible and glistening points at each macula. With correction, each eye equals 20/30.

About five weeks ago, 6% sugar showed. Tonsillectomy and Allen treatment have been resorted to. Weight increasing.

Corneal Ulcer.

Dr. Neeper presented Mr. B., age 39, from whose eye he had removed a foreign body, just above the center of the cornea, November 2nd, 1915. This healed without incident but the patient returned six days later with a small ulcer on cornea near lower nasal limbus (some 6 mm. distant from the seat of f. b.). On the 11th two small ulcers appeared midway between the first ulcer and the corneal center. The ulcers have not been deep but have spread, including the lower central corneal tissue.

DISCUSSION.

Dr. F. R. Spencer and Dr. W. A. Sedwick thought it might be due to tubercular infection.

Dr. D. H. Coover said that in such case he would use pronuclein.

Glaucoma.

Dr. Neeper also exhibited this patient. Mrs. D., aged 29. First seen June 28th, 1915, with a history of the right eye having been painful for the past three years, and blind for the last two years. No perception of light. Tension about plus 2, pupil 9 mm. in diameter. Anterior chamber shallow. The painful attacks have become more frequent the past few months and last about ten minutes. This eye had been struck with a bough of a bush more than three years before, but at the time the pain had not been so great but that she went on to Sunday school.

Right eye transilluminates normally.

January 12th, 1916, tension of left eye 55 to 58 mm. with vision 20/15 plus, field for red slightly contracted, normal for green. Fundus slightly hyperemic. No cupping of the disc or other glaucomic evidence.

Choked Discs.

Dr. A. C. Magruder presented Mr. F. G., aged 40. Family history negative. Has had measles, whooping cough, diphtheria when six or seven, scarlet fever at 13, and la grippe. At the age of 21 was struck on head, near parieto-occipital suture, with a rock and knocked unconscious for 20 minutes.

For past 18 years has been working as mechanic for R. R. during which time he realized that he could not see well but never wore glasses. Six or seven years ago, noticed that it required an effort to read but had no difficulty in doing his

work. Eyes blur and streaks appear but clear up on looking intently.

Ophthalmoscope reveals choked discs, the left being the more pronounced. Vision 20/40 in each eye. There is staggering gait with tendency to fall to right or left.

Diagnosis, that of non-localizable brain tumor for which I strongly urge early decompression operation, to preserve, insofar as may be, the remaining eyesight.

DISCUSSION.

Dr. F. R. Spencer thought that it might be due to cerebellar tumor. Dr. F. E. Wallace advised X-ray examination, while Dr. D. H. Coover, because of the character of the macular changes, believed that a kidney lesion might possibly have something to do with causation.

Drs. Patterson, Crisp and Neeper suggested that a Wassermann test be made.

Paralysis of External Ocular Muscles.

Dr. Magruder presented F. J., 33 years old. Eleven years ago was treated for lues. Wassermann negative five years ago. No manifestation of disease until August, 1915, when he noticed drooping of the upper right eye lid and diplopia which interfered with work and locomotion. On September 1st, 1915, when I first saw him, there was complete paralysis of all the muscles of the eyeball except the external rectus.

Diagnosis: Paralysis of motor oculi nerve, specific in nature. The interesting point is that with my large doses of iodide (80 grs. t. i. d.), also mercury and salvarsan, no improvement can be noticed except that the ptosis is somewhat less.

DISCUSSION.

Dr. Coover said that he would push the K. I. to 400 grs. a day and Dr. Neeper would try sod. cacodylate.

Eye Injury.

Dr. Magruder also had present B. W., 19 years of age, whom he had first seen on September 3rd, with history of having been struck in left eye with rock two days before. Eye very painful and red. Wound in lower corneal margin with iris prolapse. Next day protruding iris found to be firmly cemented to corneal wound. This was liberated and snipped off, considerable hemorrhage appeared in anterior chamber. Edges of iris did not resume their normal position and three

days later I attempted to replace them but without success, fearing too much interference as the eye was still highly inflamed. September 9th to 13th Dr. Neeper saw patient and used fluorescein for diagnostic purposes. On the 13th I first noticed a corneal opacity which covered entire cornea except at the upper corneal margin where the cornea was clear for about 1 mm. Atropine, dionin and high frequency were used and the corneal opacity began, very slowly, to clear up. It would take no stain. The general condition of the eye was much better; pain and redness about all gone but some opacity remained. It looked at first like decemetitis but later resembled an interstitial keratitis. Media clear before hemorrhage: poor vision following absorption of hemorrhage, which at the time was thought to be due to the corneal opacity but as this cleared up so that the fundus should have been seen it was found that no reflex could be obtained and the vitreous appeared milky. There may be a detached retina. Corneal opacity now covers about half the corneal area. Wassermann negative. Vision, light perception, except from lower field patient can distinguish objects.

Iridocyclitis due to Pyorrhea.

Dr. W. A. Sedwick reported a case of recurrent iridocyclitis, the cause of which had long remained obscure. The first attack had begun in December, 1911, and was treated successively, with sodium salicylate, mercurial inunctions combined with potassium iodide (a Wassermann test having proved positive) and atropine locally, with but temporary relief. Slow recovery followed the use of a blister on the temple and the administration of salvarsan, but the pupil remained fixed and irregular. A second attack, accompanied by severe pain, occurred in March, 1915, and lasted in spite of treatment, for two or three weeks, subsiding suddenly after the application of three Swedish leeches to the temple. A relapse five days later was again relieved by the use of leeches. Another attack in October, 1915, was equally resistant to treatment. Examination of the mouth then showed the presence, beneath the gums of such teeth as were not false, of pus which was easily expressed. All medication was stopped and the patient at once sent to his dentist, who pulled the teeth. The patient slept that night for the first time in several days, and made a rapid recovery without further treatment. The case was another example of what Beaumont has termed "The dethronement of irido-

cyclitis from the position of an independent disease to the secondary one of a complication."

Dr. Sedwick in closing the discussion gave the results of the work of Dr. Anna Williams of the New York Health Department following her investigations of the amoebic diseases of the mouths of school children between the ages of 5 and 16. She found the amoeba present in 29% of children with healthy gums—in 37% of children with healthy gums but diseased teeth—in 65% of children with tartar and receding gums and in 91% of those having spongy and bleeding gums. The doctor then asked what, if any, advantages might be expected following emetin treatment in ocular inflammation secondary to pyorrhea?

E. T. BOYD,
Secretary.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

MR. PRIESTLEY SMITH, PRESIDENT.

FEBRUARY 2, 1916.

The following cases were shown: Mr. J. Herbert Fisher, Arterio-venous aneurysm; Mr. Arnold Lawson, Coloboma of the upper eyelid; Dr. Attlee, Congenital dermoid of the conjunctiva; Mr. G. H. Pooley, Lymphoma of orbits.

Amaurotic Family Idiocy.

A paper by the late Mr. George Coats was read by Mr. Affleck Greeves, entitled "The Cause of the Ophthalmoscopic Appearances in Amaurotic Family Idiocy." The author, in this paper, deals with a contribution by Dr. F. E. Batten and Mr. Stephen Mayon on "Family Cerebral Degeneration with Macular Change," in which those authors state that there is a close relationship between these cases and instances of amaurotic family idiocy, the only difference between them being that the macular region in amaurotic family idiocy shows a much more marked oedema of the internuclear layers, and therefore a white area around the macula associated with a hole or thinning of the retina at the fovea due to oedema, their conclusion being that oedema of the internuclear layers was present in both diseases, but much more markedly in amaurotic family idiocy. In the present paper the author says that for a histological study of the retina, the material must be absolutely fresh, as *post mortem* changes begin two hours after death;

fixation must be perfect (Zenker's solution being the best), and the method of cutting must be suitable. Coats considered that in the retina, apart from the occurrence of oedema, the macular changes show marked differences in the two diseases; and these are enumerated. He repudiated the view which had been ascribed to him that the ophthalmoscopic appearances in amaurotic family idiocy are due to coagulation necrosis. Though the particular form of chromolysis, vacuolization, etc., which characterize family cerebral degeneration closely simulates that which is seen in amaurotic family idiocy, the underlying cause may be different; and the race selectiveness of amaurotic family idiocy should cause hesitation in identifying it with a disease which is not race selective.

DISCUSSION.

Mr. Mayou, in discussing the paper, agreed that formalin, which was used in the case described by Dr. Batten and himself, was not a good fixative, but in one of the cases reported he thought the appearances could be fairly relied upon, except in regard to oedema in the internuclear layers.

Mr. Treacher Collins thought the paper might well have been entitled "Causes of Opacity of the Retina," as it dealt with the wider subject. In the class of cases dealt with by the author, he seemed to have established that the opacity of the retina was due to a change in the ganglion cells.

Mr. J. Herbert Parsons said he had cut sections from a case of amaurotic family idiocy, and there were large oedematous spaces, similar to those in Dr. Batten's and Mr. Mayou's case, and he did not think they could be explained merely as the result of bad fixation. A good fixative, like the Zenker, might cause an artefact appearance in the opposite direction to that alleged in this paper. He regarded amaurotic family idiocy as one of the most sharply defined clinical entities known.

Superficial Linear Keratitis.

Mr. Holmes Spicer and Mr. Affleck Greeves contributed a paper on "Superficial Linear Keratitis." The condition was one in which there were superficial ridges of epithelium, raised above the level of the cornea, mostly running in vertical lines, grey and tapering, and having along their course bulging node-like appearances; they had tapering ends, and did not extend quite to the limbus. They not uncommonly showed punctate staining, but there was no iritis. The tension of the eyeball was nearly always *minus*, and during such times the

vision was definitely impaired, though it recovered when the normal tension was re-established. It differed from a dendritic ulcer (which it appeared to simulate) especially in the reduced tension. No measures he had employed had prevented recurrences. A number of drawings and microphotographs illustrated the contributions. It was discussed by Messrs. Cole Marshall, J. B. Lawford, D. L. Davies.

Cataract in Thyroidectomy.

Mr. Walter Edmunds read a paper on "Cataract in Experimental Thyroidectomy." He said he did not think the lens opacity was due to disease of the eye itself; in the dogs dealt with the pupil was active, and there was perception of light. He thought the cataract was due to the general nutritional changes following the removal of the thyroid gland, and the fits seemed to be due to that. Similar instances had been recorded in man. The cataractous changes which he found were not of the lamellar or any special type. When the parathyroids were also removed, the animal quickly sickened and died, the death being preceded by tremors.

The paper was discussed by Messrs. Herbert Parsons and Herbert Fisher, and Mr. Edmunds replied.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

SIR ANDERSON CRITCHETT, BART., C. V. O.,

PRESIDING.

MARCH 22, 1916.

Colonel Lister, A. M. S., C. M. G. and Lieut.-Col. Gordon Holmes, M. D., R. A. M. C., read a paper entitled "Disturbances of Vision from Cerebral Lesions, with Special Reference to the Cortical Representation of the Macula." The authors stated that in their work at the base hospitals in France during the past 18 months, they had observed a very large number of cases in which the vision was affected by lesions of various portions of the optic system, but the time and opportunity afforded had not been sufficient for the careful and complete examination of all. Hence in some cases of considerable clinical importance only scanty and incomplete notes had been secured. Still, by selecting for thorough examination a certain number of suitable cases, a group of facts had been collected which had an important bearing on the cerebral localisation of vision, more

particularly on the representation of different regions of the retina in the cortex. It may be objected, say the authors, that as the observations were, necessarily, made at an early stage after the infliction of the injury, some of the effects observed may have been due to functional disturbances, rather than to local injuries of the corresponding areas or their centripetal fibres. But if it could be shown that there was a constant relation between the probable site of the injury and the form of the visual defect, certain conclusions would at least be justifiable.

The injuries in the cases referred to included penetrating and perforating wounds of the cranium by rifle bullets, shell fragments and shrapnel, as well as local concussion and depressed fractures. They remarked on the striking rarity of superior quadrantia hemianopia in gunshot wounds of the occipital region.

The authors point out that in over 2,000 cases of head injury they never saw a central scotoma when a direct injury of the occipital poles could be excluded, and they regard this as striking evidence that central vision is represented on either, or both, the mesial or the lateral surface of the posterior borders of the occipital lobes. And the observations conformed to the general view that the visual area corresponds with, or at least includes, the area striata.

The interesting question is discussed as to whether vision for colours may be dissociated from that for white: in other words, whether an achromatopsia can be produced by cerebral lesions. The authors consider that they have gleaned no conclusive evidence that achromatopsia, with intact vision for white, is produced by cerebral lesions which involve either the cortex or the optic radiations.

The authors' conclusions, which they do not yet regard as final, are formulated as follows:

(1) The upper half of each retina is represented in the dorsal, and the lower in the ventral, part of each visual area.

(2) The centre for macular or central vision lies in the posterior extremities of the visual areas, probably on the margins and the lateral surfaces of the occipital lobes.

(3) That portion of each upper quadrant of the retina in the immediate neighborhood of, and including, the adjacent part of the fovea centralis, is represented in the upper and posterior part of the visual area in the opposite hemisphere, and *vice versa*.

(4) The centre for vision from the periphery of the retinae is probably situated in the anterior end of the visual area, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forwards in the visual area.

The contribution concludes with a grateful acknowledgment of the assistance received from the medical officers of the various hospitals in which the cases were observed, and of the help of Captain Curtis Webb in the preparation of the illustrations.

The Chairman, in expressing the gratitude of the Section to the authors for their painstaking research, referred to the rapid strides made by brain surgery, and the unexampled opportunities afforded by the present conflict to make advances in surgical and medical knowledge.

Lieut.-Col. Elliot asked whether Colonels Lister and Holmes were able to confirm the estimate as to the efficacy of the steel helmet in preventing head injuries. He also referred to the greater severity of wounds inflicted by bullets which struck in the first 250 yards of their flight, before they had settled down to their steady onward course, as compared with those which found their billet at distances between 250 and 1,000 yards.

Captain Ormond suggested a possible confirmation of the authors' thesis in the central scotoma met with in some people who were subject to migrainous attacks. It was probably a vascular phenomenon, dependent on the macular centre being placed at the posterior pole of the occipital lobe.

Mr. Leslie Paton urged ophthalmologists in this country who received cases from France after the shock and the acute symptoms had subsided, to exercise great care in the taking of the fields of vision and the construction of perimeter charts (though not with the McHardy perimeter), and follow the cases up, as far as possible, keeping a record of their sequelae, and in that way assist in making the investigations of the authors of abiding value.

Mr. J. H. Parsons supported Mr. Paton, and asked that when ophthalmic cases were sent over, the notes should accompany them.

Col. Holmes briefly replied, remarking that as the steel helmets had only recently been issued to the British Army, it was as yet too soon for conclusions to be drawn.

Grand Rapids, Mich., April 20, 1916.

Editor OPHTHALMIC RECORD:

Permit me to call your attention to the article in the recent April number of the OPHTHALMIC RECORD by Dr. Ray, of Cincinnati, entitled "A New Operation for the Retention of a Movable Stump as a Substitute for Enucleation." This operation can scarcely be called new as it was described by myself in the *Journal of the American Medical Association*, February, 1900, and in the recently issued *System of Ophthalmic Operations*, page 627, edited by Dr. Casey A. Wood. I will thank you very much for publishing this in an early issue of the OPHTHALMIC RECORD. The operation has been somewhat modified and improved since and I am still an enthusiastic believer in its value and its subsequent good results in cases in which it may be indicated.

I shall be glad, at some future day, to give you a description of the new method which I consider an improved method from that described by myself sixteen years ago and lately described by Dr. Ray.

I shall send Dr. Ray a copy of this letter. Doubtless the matter was entirely original with him as far as he was concerned, which only goes to show that the method must have value or it would not occur to different individuals with such agreement of detail.

Thanking you for this opportunity, I am

Cordially yours,

J. G. HUIZINGA.

A recent report of the expenditures of the Rockefeller Foundation for the year 1915 shows detailed gifts to the amount of more than one and a quarter million dollars. No item is included which in any way aids the cause of conservation of vision or the relief of the blind.

The collection of Ophthalmic journals and other literature in the medical library of Stanford University, opposite Lane Hospital, was donated and endowed by Dr. A. Barkan, the former Professor of Ophthalmology. Visitors are as welcome to its use as are students and other residents of San Francisco, while the courteous librarian, Miss Louise Ophüls, and her able assistants are always at the service of research scholars.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Alfred H. Riedel is chief of clinic at the newly established eye dispensary of the West Side German Hospital, New York.

Dr. Frank Brawley of Chicago announces the removal of his offices from Suite 1208 to Suite 905 at the same address, 7 W. Madison street.

Dr. Georgiana M. D. Theobald has qualified through civil service examination for the position of pathologist in the Illinois Charitable Eye and Ear Infirmary.

Drs. Duncan Eve, Senior and Junior, were entertained at a banquet by the Ophthalmic Society of Vanderbilt University Medical School at Nashville on February 17.

The Orleans Parish Ophthalmological and Oto-Laryngological Club was organized at New Orleans on March 21. Dr. Homer Dupuy is president and Dr. Charles A. Bahn secretary.

Dr. Casey A. Wood, of Chicago, has returned from California where he spent several months collecting new species of birds for his proposed monograph on the eyes and eyesight of birds.

The Perkins Institute for the Blind in South Boston, Mass., has received a bequest of \$1000 by the will of the late Henry F. Spencer of Santa Barbara, California. Mr. Spencer had been blind for many years.

The following bequests are reported: \$10,000 to the New York Eye and Ear Infirmary by the will of the late Miss Serena Rhinelander; and \$5,000 to the Knapp Memorial Eye Hospital and the same amount to the Catholic Institute for the Blind, in New York, by the will of the late Mrs. Mary A. Halloran.

The report of the British Royal Commission on Venereal Diseases states that of 1,100 blind children in the London County Council Schools for the Blind at least 55.6% owe their blindness to venereal disease in the parents.

The next meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held at Memphis, Tenn., on December 11, 12, and 13. This season is thought to be desirable on account of weather conditions and the relative ease of leaving one's duties at this time of the year.

Civil Service examination for the position of Internes at the Illinois Charitable Eye and Ear Infirmary will be held in Chicago and several other cities of the state on May 6. (Applications must be filed with the Civil Service Commissioner in Springfield not later than April 29.)

The following appointments of ophthalmologists are announced:

Drs. John A. Brophy and H. Maxwell Langdon, visiting ophthalmologists to St. Agnes Hospital, Philadelphia.

Dr. Henry W. Wandless, clinical professor of ophthalmology in the New York University and Bellevue Hospital Medical College.

Several new announcements of postgraduate ophthalmic courses have been recently issued. The San Francisco Polyclinic and Post Graduate College offers special refraction and surgical courses; the Stanford University offers a summer course including a consideration of the relation between eye and general diseases. The Chicago Polyclinic offers a combined clinical and didactic course each month of the year except in July and August.

The fourth annual meeting of the Pacific Coast Oto-Ophthalmological Society will be held in Portland, Oregon, on June 22nd, 23rd, and 24th, 1916.

Dr. Harold Gifford will be the guest of honor and will deliver the address on Ophthalmology.

A cordial invitation is extended to the Ophthalmologists, Otologists, Rhinologists, and Laryngologists of the United States and Canada to attend the sessions of the society and to participate in the discussion of the papers.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.) A. G. Wippert (E.E.N.T.)	W. F. Coleman (P.-G.) G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wippert (E.E.N.T.)	G. H. Francis (Poli.) C. H. Francis (Poli.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.)	C. H. Francis (Poli.) S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippert (E.E.N.T.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippert (E.E.N.T.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lebensohn (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) F. B. Loring (Inf.) S. L. McCreight (C.C.S.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) Robt. Von der Heydt (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) E. V. L. Brown (County) Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) F. B. Loring (Inf.) S. L. McCreight (C.C.S.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) Robt. Von der Heydt (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) E. V. L. Brown (County) Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) F. B. Loring (Inf.) S. L. McCreight (C.C.S.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) E. V. L. Brown (County) Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) F. B. Loring (Inf.) S. L. McCreight (C.C.S.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) E. V. L. Brown (County) Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) F. B. Loring (Inf.) S. L. McCreight (C.C.S.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) E. V. L. Brown (County) Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) F. B. Loring (Inf.) S. L. McCreight (C.C.S.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) E. V. L. Brown (County) Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. E. Suker (P.-G.) 2-5 H. J. Morlan (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan

ABBREVIATIONS:

*Special operative eye clinic.

County: Cook County Hospital, W. Harrison and Monroe Streets.
 Inf.: Illinois Charitable Eye and Ear Infirmary, Teoria and Adams Streets.
 M. H.: Mercy Hospital.

County: Cook County Hospital, W. Harrison and Monroe Streets.
 Inf.: Illinois Charitable Eye and Ear Infirmary, Teoria and Adams Streets.
 M. H.: Mercy Hospital.

Rush: Rush Medical College, W. Harrison and Wood Streets.
 St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.
 U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE OPHTHALMIC RECORD

A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

Vol. XXV

CHICAGO, JUNE, 1916

No. 6, New Series

AN EXPERIMENTAL COMPARISON OF THREE COMMON METHODS OF MEASURING HETEROPHORIA.

BY

FRANK W. WEYMOUTH.

(From the Physiological Laboratory of Leland Stanford Junior University.)

In the course of some work on the relation of accommodation to convergence it seemed desirable to make a comparison of the results obtained by some of the more common methods of measuring heterophoria. It was noted that in certain cases where the same person was tested with the Maddox rod and by the method of von Graefe, that the former indicated a higher degree of esophoria than the latter, and the apparatus at hand was tested to see if these differences were accidental or constant and dependent upon the form of instrument used, with the results presented in the present paper. A general statement to the effect that the results given by the Maddox rod were more esophoric than the findings of other instruments was noted in some of the text books and subsequently the available literature was examined to see if this difference had been experimentally studied. Although the literature on the eye muscles is so voluminous as to make a thorough examination laborious, the data on this particular point seems to be far from satisfactory.

The great majority of text books describe in greater or less detail some of the now numerous methods of measuring heterophoria but usually without comment or comparison. Some compare the merits of the more prominent methods with reasons for preference, occasionally dogmatic but often based on wide experience and of distinct value, as, for instance, Howe¹ or Savage². Some special articles have dealt with these questions more in detail and are extremely valuable; Jackson³, Duane⁴ and Hubbell⁵ may be cited. Even here, however, none, except Hubbell, has given any data as to the results of parallel tests by the different methods. Hubbell tested 140 cases with the Mad-

dodx rod and with the Stevens phorometer but the results in the brief form in which they are presented are far from clear and the conclusions seem very doubtful. In 36 cases the results were stated to be the same, in 71 the heterophoria as measured by the Stevens phorometer was less than when measured by the Maddox rod, and in 8 cases greater. As it is not recorded whether this heterophoria is exophoria, esophoria or hyperphoria or what the average difference is, it is difficult to draw conclusions. The author declares in favor of the rod test; "as its findings are in a large majority of cases equal to, or in excess of those of the phorometer, it is a more precise and trustworthy guide in daily practice than the phorometer." That the most accurate phorometer should show the most heterophoria seems a thesis hard to defend either on theoretical or practical grounds. The absence of comparative results based on actual experiments as apparent by a survey of the published work is the justification for burdening an already excessive literature with the present contribution.

The apparatus used and the method of carrying out the tests will first be described. The tests included the Maddox rod and the method of von Graefe, as it was in the use of these two common procedures that the question of accuracy first arose. The parallax test as described by Duane⁶ was selected as an extremely delicate method and, since based on the soundest physiological principle, the one most likely to give a true picture of the conditions. As pointed out by Jackson³ when the eyes are alternately covered one is always entirely free from any stimulus and hence from any possible directive influence except that involved in the associated movements which it is desired to measure.

The instrument in the laboratory is the Wilson phorometer. This consists essentially of a standard supporting before the left eye an adjustable rotary prism reading up to 10 prism diopters and so mounted as to produce at will deviation either vertically or horizontally; and before the right eye a disc which may be rotated so as to bring before the eye a 10 or a 15 diopter prism for the von Graefe test, a 10 D cylindrical lens, a Maddox double prism or an aperture through which the eye may see the test object directly or into which may be inserted a Maddox rod or other device. For the von Graefe test a 10 diopter prism base up was used before the right eye:

for the Maddox rod a red Maddox multiple rod was used. For the parallax test the space in front of the right eye was left free and a metronome to the pendulum of which was attached a card was allowed to beat before the phorometer in such a way that one eye was always covered. A rate of about one double beat a second, screening each eye once each second, was found very satisfactory; with too rapid a rate fusion is maintained even if heterophoria is present. The appearance at this rate when heterophoria is present or when the adjustable prism is not set at zero, is a lively jumping of the point of light back and forth, corresponding to the extent of the movement of fixation when the eye is suddenly exposed and the image falls outside the fovea. At the time that this device was used it was thought to be a new application of the parallax test, but it was later found that a mechanical shutter similar in principle had already been employed by Verhoeff⁷⁻⁸. This shutter was operated by hand, however, and the entirely automatic action of the metronome was found to be superior to a hand operated screen both because of its uniformity of action and because it could be run for any desired length of time without fatigue.

By using this phorometer all the readings were made with the same adjustable prism so that any error, if present, would be constant with all the tests, a condition of obvious importance where comparative results are in question, and one not met where different instruments are used for the different tests. This apparatus was used in a dark room from which the light could be completely excluded. As a test object for fixation an electric lamp enclosed in a light tight box was used: a diaphragm pierced by a hole about 2 mm. in diameter gave a small and sharply defined image which was improved by a screen of oiled paper which prevented the "star" effect. This was placed at a distance of approximately 7 meters and a little below the level of the eyes. The subjects were students in a course in the physiology of the sense organs and had all had some experience in the use of optical instruments including phorometers. The list includes no bad cases of ametropia: if any ametropia was present the correction for distance was worn. The vigorous exclusion of ametropia would, however, not affect the results of the present work, since the comparison of the different tests for heterophoria and not the establishment of any physiological norm in this respect was aimed at.

In making the readings the apparatus was adjusted so that the head might be held comfortably erect, and the rotary prism turned to a reading unknown to the subject, in order to avoid his use of the zero point in any way as a basis of comparison. The subject was then allowed to turn the milled head of the prism until he was satisfied with the position of the images. He was instructed to use care but not prolonged study as this tended to more variable results. Five readings were taken with each of the three methods and to avoid possible fatigue, no effects of which were, however, noticed, these were taken in rotation, the order usually being, von Graefe, Maddox rod, parallax, von Graefe, etc., until the fifteen readings had been made. To avoid personal differences in method the scale was read by me in each case.

Certain of these precautions are so important that though they have been pointed out by various writers, I consider that they may again profitably be emphasized. In using von Graefe's test, or any of its variations as, for instance, the Stevens photometer, a dark room or a large unfigured wall or screen against which the test light may be placed is a necessity if accurate or dependable results are desired. This has been insisted upon by Stevens², Jackson³ and others, yet a candle or electric light is often used in a lighted room covered with guide lines such as door and window frames, picture moulding and the angles between wall and wall, and wall and floor or ceiling. Under these circumstances although the two images of the test object may fall far enough apart to avoid any stimulus to fusion, there is never lacking images of horizontal or vertical lines, according as the displacement is lateral or vertical, which overlap and are regularly fused by the observer thus concealing all heterophoria. This is particularly the case with certain classes of low degree heterophoria where the long practice in fusing displaced objects leads to an instant alignment of the images on the slightest hint, even that furnished by the lighting of a dark room by a single candle, and it is of course these very cases that we want to discover.

Most of the subjects thought the Maddox rod test the easiest and in its use came more promptly to a decision; a few only, noticed a tendency to fusion. Many complained in the von Graefe test of difficulty in "judging" when one light was exactly above the other. That this difficulty is deceptive is

shown by the results to be given; the readings by this method are less variable than by either of the others. To all the parallax test was new. A few found it very easy to make a judgment, for others it was more difficult, but on the whole it proved to be a very satisfactory test. It was found that those who had some slight hyperphoria, so that there was a vertical as well as a horizontal "jump" to the point of light, could make a more rapid and accurate setting of the prism. Acting on this suggestion a prism of 1 diopter base up or down was used with good results in some of the last subjects tested.

The following table (Table 1) gives the results of the tests of 11 people. Each value for the heterophoria by each of the methods represents the average of five determinations, and with each is given the mean variation from this value. Esophoria and exophoria are represented by the plus and minus signs respectively, on the basis that esophoria represents a positive convergence and exophoria a negative convergence. All readings taken have been included and the only selection has been the exclusion of one subject that showed a high degree of esophoria and an unusually great variability.

TABLE NO. 1.

				von Graefe		Maddox rod		Parallax	
					m.v.		m.v.		m.v.
1.	Mr. R.	March	31	-3.17	.16	-1.6	.16	-2.72	.09
2.	Mr. A.	April	1	-2.53	.12	-1.95	.36	-2.45	.16
3.	Mr. M.	"	9	-1.9	.36	-3.12	.42	-1.73	.66
4.	Mr. G. B.	"	9	-0.88	.2	-1.42	.34	-2.22	.34
5.	Mr. B.	"	16	-0.91	.23	+0.77	.7	-0.03	.9
6.	Mr. J.	"	22	+0.94	.59	+0.21	.36	+0.54	.51
7.	Mr. P.	"	23	-0.06	.47	+0.5	.68	+0.76	.93
8.	Miss S.	"	23	-2.08	.26	-1.54	.29	-1.68	.29
9.	Miss M.	"	30	-0.68	.26	-0.56	.09	-1.18	.23
10.	Miss W.	"	30	+2.88	.39	+3.02	.82	+0.52	1.02
11.	Mr. D.	"	30	-1.74	.29	-1.79	.13	-1.99	.11
Total				-10.13	3.33	-5.59	4.35	-12.18	5.24
Average				-0.92	.303	-0.51	.396	-1.11	.477
Corrected				-0.01	.	+0.4	.	-0.2	.

As an example of the actual readings obtained the following three sets of observations made upon myself are given (Table 2). Although in none of the other cases were as many observations made, some of the results were fully as uniform.

The most striking feature of these tables is the surprising uniformity of the results. The average of the 11 persons shows a difference of only 0.6 prism diopters (a deviation of about 20' 36") between the results of the most divergent methods.

This is less than the error due to measuring heterophoria at a distance of 6 meters, which, although it amounts, with an interocular distance of 64 mm. to a trifle over 1 prism diopter, is universally disregarded. If the correction for the distance at which the present observations were made (7 meters) is applied, the figures become: von Graefe, $-.01$, Maddox rod, $+.4$, parallax, $-.2$. Apparently the group considered, a fairly normal one, are orthophoric by the von Graefe test, slightly

TABLE NO. 2.

	von Graefe		Maddox rod		Parallax	
	Hetero.	m.v.	Hetero.	m.v.	Hetero.	m.v.
March 18	-1.75	.078	-1.75	.1	$-2.$	.95
	$-2.$	.172	-1.4	.45	$-3.$	.05
	-1.3	.528	-2.6	.25	$-3.$	.05
	-2.75	.922	$-2.$	.15	$-3.$	.05
	-1.5	.328	-1.5	.35	-3.75	.2
	$-2.$	.172				
	-1.5	.328				
Ave.	-1.83	.36	-1.85	.13	-2.95	.13
March 26	-1.2	.125	-1.4	.06	-1.25	.885
	-0.5	.575	$-1.$	.46	-2.75	.615
	-0.25	.825	-1.5	.04	$-2.$	.135
	-1.4	.325	-1.8	.34	-2.25	.115
	-1.5	.425	$-2.$	.54	$-2.$	.135
	$-1.$	.075	-1.6	.14	-2.4	.265
	-1.2	.125	-0.6	.86	-1.25	.885
	-1.5	.425	-2.1	.64	-1.9	.235
	-1.1	.025	-1.4	.06	-2.75	.615
	-1.1	.025	-1.2	.26	-2.8	.665
Ave.	-1.08	.3	-1.46	.34	-2.14	.46
April 1	$-2.$	.56	-1.6	.505	-2.5	.205
	$-1.$	.44	$-1.$	.095	-2.5	.205
	-1.5	.06	-1.9	.805	$-2.$	.295
	-1.25	.19	-0.4	.695	$-2.$	.295
	-1.75	.31	0.	1.095	-2.4	.105
	-1.5	.06	-1.25	.155	-1.5	.795
	-1.9	.46	-1.4	.305	-2.2	.095
	-1.5	.06	-1.5	.405	-2.6	.305
	$-1.$	.44	-0.4	.695	-2.5	.205
	$-1.$	.44	-1.5	.405	-2.75	.465
Ave.	-1.44	.3	-1.1	.52	-2.3	.3
Ave. of Aves.	-1.45	.32	-1.47	.33	-2.46	.3
Corrected	-0.54		-0.56		-1.55	

esophoric by the Maddox rod and very slightly exophoric by the parallax test. A similar difference has been recorded by other workers, though usually in round figures and without statistics: for instance Verhoeff⁸ states that the parallax test as carried out by his shutter shows about 2° of exophoria in eyes apparently orthophoric by the vertical diplopia test or a correspondingly lower degree in esophoria eyes. The present results would indicate that 2° is far too large a difference; possibly this is due to the neglect of some of the precautions observed in the present experiments. However this may be, the differ-

ences here shown between the three methods are so small as to fall below the limits of error as these tests are applied in routine eye examinations, and any of the methods might be employed or the results of two combined without affecting their value as commonly used.

If the tests should be carried out with fewer precautions, of which I consider the dark room by far the most important, the results might be very different. In fact I am convinced that certain forms of heterophoria of considerable extent commonly fail of detection when the von Graefe test is used in a lighted room. Another precaution is suggested by the present work though not shown in the tables. When a complete picture of the muscular condition is to be obtained, as for instance the balance in the distance, the balance at reading distance, the range of relative accommodation and of relative convergence, the range of accommodation and the range of convergence, all measurements should be made at one time. The variation from day to day as affected by fatigue or general health is often surprising and a composite picture from measurements made on different days is often misleading unless, of course, the series is extensive enough to give reliable averages. In fact several complete examinations under different conditions are necessary to an accurate knowledge of the state of the muscles.

Considered more minutely, the results seem to support Duane's claims for the accuracy of the parallax test, as the greater divergence obtained by this method would indicate a more complete relaxation of the muscles. A suggestion made by Duane⁴ in regard to the Maddox rod will increase the accuracy of this method, where this is necessary or where, as sometimes happens, it fails with a particular subject. If a card is used to cover alternately the rod and the free eye the accuracy of the parallax test is obtained. This arrangement was tried and the results justify his claim.

Turning to the variability of the results it is seen that the von Graefe test shows a small but constant superiority, and this in spite of the fact that most subjects complain of the difficulty of judging when the lights are exactly above each other. The mean variation in no case equals $\frac{1}{2}$ prism diopter, so that the accuracy is striking. In the larger series of measurements on myself the agreement in mean variation is even closer, and similar results would probably have been obtained in most of

the cases if more observations had been made. The von Graefe method and the Maddox rod give practically the same degree of heterophoria but the parallax test shows about 1 prism diopter more exophoria. It is possible that with higher grades of heterophoria the variations and the differences between the methods would have been greater, but this would not necessarily invalidate the present conclusions.

Summary.

In the present work a comparison is made of the results obtained in measuring the heterophoria of twelve persons by the von Graefe test, the Maddox rod and by a modification of the parallax test. As far as known the results of such a detailed comparison have not heretofore been published.

The results show, both by the degree of heterophoria and by the variability of the readings, that, when conducted with certain precautions, all the methods give accurate and consistent measurements which differ so little as to make the choice of method a matter of indifference.

The most important precaution to be observed is the use of a darkroom, particularly with the von Graefe test or with the Stevens phorometer; lacking the dark room the test object should be placed against a *large, unfigured* wall or screen. The ordinary tests may be improved or checked by alternately covering the eyes occasionally during the observation as suggested by Duane. The variation from day to day will usually greatly exceed the variation between the results of the various methods, and a reliable picture of the muscular condition can only be obtained by several observations under varying conditions.

In short the tools at hand for measuring heterophoria are sufficiently accurate and reliable if appropriate precautions in their use are observed.

The corrected results represent the averages less .91 prism diopters of convergence, the amount that should occur in eyes with an interocular distance of 64 mm. when viewing an object at 7 meters—the conditions of the present experiments.

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INDIRECT INJURIES OF THE CHORIOID AND RETINA.

With the Preliminary Report of a New Operative Treatment
for Retinal Detachment.*

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Certain direct, as well as certain remote lesions or disorders of the optic apparatus seem to be pre-eminently, and in some instances peculiarly lesions or disorders of battle, or of the prolonged and intense strain of active military service, for their occurrence in civil and industrial life is of extreme rarity, or has passed nearly, if not quite unrecognized.

Most notable among these lesions or disorders are horizontal hemianopsia, the syndrome of concussion produced by high explosives, that associated with the grosser lesions of the superior longitudinal sinus and its tributary lacunae, the nystagmus of projectile lesions of the foot of the second frontal convolution, the syndrome associated with lesions of the sympathetic cilio-spinal centers and nerve trunks, pulsating exophthalmos, military night blindness and the sudden manifestation of previously unsuspected errors of refraction.

To this list must further be added two forms of indirect injury to the deep coats of the eye: 1. Those which are

*The proposed method sprang from a consideration of Deutschmann's injection of animal vitreous, of Kuhnt's successful substitution of the vitreous, and of the clinical course of certain cases of traumatic hemorrhage into the vitreous in which vision was fully restored. Not until some time after completing this paper and the experimental work upon rabbits upon which the surgical procedure is based, did the writer become aware of an identical suggestion by Dr. H. S. Gradle, reported in the *Annals of Ophthalmology*, January, 1916, p. 169, as being made during a discussion of Dr. Thompson's paper, reported in the same issue.

purely the result of air contusion or decompression and with which this present paper is not concerned in detail. La-grange¹, Bernhardt², Pagenstecher³, Darier⁴, vGrosz⁵, Zade⁶ and others have reported indisputable lesions from this source which include retinal and vitreous hemorrhage, chorioidal rupture, retinal opacity and traumatic cataract, the latter being of interest in that it may be spontaneously resorbed and may require merely the addition of the necessary cataract glass in order to restore good vision. 2. Indirect lesions in which the ocular coats have been detached, ruptured or otherwise traumatized through contusion, penetration or perforation of the orbital cone by projectile or other injury, with no possibility of contusion of the globe either directly or through the lids, or secondarily by fragments of bone driven from the condensed orbital margin. Such lesions make up about 6% of all battle injuries of the eyes in present-day warfare. Most of them result from oblique perforations of the fronto-malar region and antrum and form a type of injury which parallels the unique cases of indirect rupture of the intestinal coats by projectiles which have perforated the abdominal wall, tangential to the parietal peritoneum, without damaging this tegument.

Regardless of the mechanism by which the energy of the projectile or other traumatizing agent is transmitted from the bony orbit to the globe, this deflected energy is shown by the clinical evidences to be most effective for trauma in the region about the posterior pole. Here Berlin's opacity, retino-chorioidal hemorrhage, retinal detachment, chorioidal rupture and retinal tears occur in about this order of frequency, and in nearly every combination possible. The characteristic form of healing of the torn surfaces is that of Retinitis Proliferans and the visual defect is often grave and permanent even though the condition be recognized and treated early.

That these lesions are found most often about the posterior pole has hitherto been explained by the theory that the sudden displacement backward of the globe causes a momentary indentation of the eyeball by the optic nerve, with the production of concentric folds, the rupture of whose apices gives rise to the curvilinear tears not uncommon after direct contusion. (Footnote.—This theory is an attempted application of the phenomena of water splash, so ably demonstrated by Worthington in his "A Study of Splashes"—Longmans, Green, 1908—and this presumed method of production of concentric folds

is an attempt to accord Plateau's law, dealing with the production of concentric waves in fluids, with the clinical findings in these cases.) According to this theory the maximum of trauma should be sustained at some part of the circumference of the papilla, a situation which, as a matter of clinical fact, is very rarely involved. Further, both the vascular and avascular parts of the optic nerve lying free in the orbit in connection only with soft, yielding orbital fat and the S-shaped curve of the nerve, as well as the varying obliquity of its entrance into the globe not only allow free mobility of the globe, but enable the nerve to yield immediately to the least pressure exerted upon the eyeball. The concept, then, of this yielding structure acting upon a comparatively rigid globe of incompressible fluid with the consequent production of traumatic lesions of the walls of the globe is difficult, if not impossible of belief. While concentric tears of the chorioid are not uncommon in the type of injury under discussion, the fact that the lesions may assume all manner of forms, may be horizontal, vertical, branched, stellate, or cruciform and so located as to obviously exclude the optic nerve as a factor in their production, would seem to indicate that a different theory of causation must be sought.

The chorioid, or more particularly the choriocapillaris, which suffers the gravest damage in this type of injury, must be considered, for the purposes of mechanics, as a sheet of fluid blood divided into irregular compartments by frail, endothelial walls and from two to three times thicker above the fovea and the region of the posterior pole. That the containing laminae of this sheet are under constant tension is shown by the gaping of every choroidal tear. Pressure is transmitted through the humors with equal force in all directions and on the principle that destructive energy when transmitted to enclosed fluids has an effect directly proportionate to the amount of fluid set in motion, this traumatic effect must reach its climax about the posterior pole, although the individual anatomical variations will naturally vary the locus of greatest susceptibility. The sclera and chorioid are further weakened⁷ in this situation by the entry of the twenty odd short posterior ciliary arteries, which dispose the posterior pole to trauma in exactly the same manner as the anterior sclera is weakened by the perforating vessels. The precapillary branches of these arteries approach the choriocapillaris almost vertically about

the posterior pole, thus forming a natural line of cleavage for any force which is effective at right angles to the surface of the chorioid.

By correlating these anatomical facts to the types of lesion, the main factors in the greater localization of injuries in this region appear to be the greater thickness of the retina and the fluid chorioid and the greater structural weakness.

The less fluid and inelastic retina sustains the impact of the transmitted force and the transitory oedema which follows this contusion of the retina is observed in practically every case of this injury when seen early enough and not obscured by hemorrhage into the vitreous. The retinal changes in this commotio retinae are comparable to those of cerebral commotion. The diffuse milky haze reaches its height in from several hours to two days and in the lighter cases disappears in from two to three days more, without leaving a macroscopic or functional trace of its existence, although scotomata are frequently found without corresponding gross retinal changes. In the more intense cases macular pigmentation may appear after varying intervals and is always associated with marked loss of vision and even with late optic nerve atrophy. As in cerebral commotion, capillary hemorrhage occurs frequently and this is not uncommonly limited to the macula in the form of a cherry red spot not unlike that seen in embolism of the central artery. Local atrophy and grave functional changes result. Of course hemorrhage into the vitreous is the constant accompaniment of every tear of the chorioid and retina and in most cases this is rapidly absorbed. In some cases, however, absorption seems excessively slow and in these, if not in all cases of intraocular hemorrhage where the tension is not too low, the use of eserine, as suggested by Feilchenfeldt, seems to be logically indicated.

Retinal detachment occurs in a surprisingly large proportion of these cases and a study of the cases seen by the author and those reported by Rollet and Mangini⁹, Lagrange¹ and others leads to the following conclusions:

1. Spontaneous reattachment of detached retinae produced by indirect injury occurs in from one-third to one-half of the cases.

2. Practically all of these cases were treated as ambulatory patients, which lends strong support to the opinion that there is less intraocular movement and far more chance of

adhesion where the head is held erect, while awake, than when it is rolling from side to side upon a pillow.

3. A distinction must be made between the prognosis of traumatic retinal detachment and that of purely exudative origin.

4. The author is of the opinion that the present wide differences in the outcome of traumatic and exudative retinal detachments may be lessened by the adoption of the following method, of which this is the preliminary announcement.

Practically every simple retinal detachment occurs at the expense of the vitreous and when the subretinal fluid is aspirated, lack of reattachment must be due mainly to a lack of prompt secretion by the ciliary body, whereby the vitreous may be forced to press into the old indentation and thus hold the retina and chorioid in apposition until they have adhered.

With the object of deliberately accomplishing this apposition and of splinting the retina into its position against the chorioid, the author, experimenting with rabbits, has followed the aspiration of artificial subretinal fluid through a trephine opening in the sclera, by the careful introduction of warm normal salt solution directly into the vitreous, using an amount of saline slightly in excess of the amount aspirated and carefully checking up the effect of this excess upon the intraocular tension. The process may be repeated if necessary and the careful introduction of normal saline into the vitreous does not appear to produce the least degeneration of this humor, or to produce any obvious deleterious effect upon its optical index. It will be obvious that this experimental work cannot fairly be said to reproduce the conditions of chronic exudative detachment, but it has definitely shown (1) that the vitreous tolerates the presence of warm, sterile, normal saline when injected slowly and in quantity not sufficient to raise the intraocular tension much above normal and (2) that when this injection is made deep into the vitreous substance, vitreous and not saline is forced against the retina, thus preventing the chance of too rapid absorption of the saline.

Undoubtedly aspiration of the subretinal fluid will remain the method of election in all recent traumatic detachments, but where repeated aspiration fails, the proposed method seems worthy of trial.

The cases in which it is anticipated that neither this nor

any other method yet evolved will prove fully curative, are those old detachments in which bands have formed and contractions have occurred and in the acute subretinal exudations of nephritic retinitis, in which it is impossible to check or to deflect the exudation by local and general measures of forced elimination such as a dry, restricted diet, sweating and the local use of dionin. In my opinion subconjunctival injections are valueless in this condition.

In most cases of indirect injury of the fundus there is no pain referred to the eye, the uninjured eye retains its normal vision and the injured eye its normal external appearance. In a few cases a transitory hyphaemia, or some interference with the musculature of the iris may call attention to the injury, but the patient is seldom aware of the gravity of the damage sustained and the discovery, if made at all, is usually accidental or follows injury of the sound eye. Frequently the local lesion in projectile wounds is of so distressing a nature that its gravity or interest precludes all search for associated lesions and this is equally true after severe falls or blows upon the face or head in civil and industrial life.

The traumas of military, civil and industrial life differ mainly in degree and in the comparative frequency of certain types and I am convinced that many of those injuries or syndromes involving the eyes, as well as other regions, which have come into recent prominence as traumatic novelties of warfare, will be shown to have their duplication or miniature in civil practice, if carefully sought for. The case which follows justifies this belief as regards indirect lesions of the fundus:

W. E. H., now a man of 30, when 8 years old was dragged for some distance by a runaway mule, his right frontal boss being fractured horizontally about 3 cm. above the margin of the orbit. He recovered without complication, although no examination was made of his eyes. When about 20 he first noticed that he saw poorly with his right eye. There is absolutely no other history or clinical evidence of any condition, injury or disease which could have had any bearing upon the production of the lesion found in the right fundus. Just above and involving the macula is a typical area of old Retinitis Proliferans with a small central plaque of atrophy and pigmentation. The base of the area occupies a space of about two D. D.s and dull grayish streamers project a slight distance out

into the vitreous. Aside from this spot of old injury the fundus is normal.

O.D. V=6/15-1 glasses do not improve. Barely reads Jaeger 8 at 10 inches.

O.S. V=6/15-2 —0.25—0.75 ax. .90=6/6. Jaeger 1 read easily at 13 inches.

Summary and Conclusions.

1. In every projectile injury of, and every severe fall or blow upon the head and face, the possibility of accompanying and related intraocular lesions should be considered and excluded by a thorough examination.

2. Indirect lesions of the retina and chorioid make up about 6% of all battle injuries of the eye in present-day warfare.

3. The main factors in the localization of these indirect injuries about the posterior pole appear to be the greater thickness of the retina and the fluid chorioid and the greater structural weakness of this region.

4. Retinal detachment occurs frequently after this injury and is remarkable in that spontaneous reattachment occurs in from 1/3 to 1/2 of the cases. This high percentage of reattachment is ascribed in part to the youth, good health and previously normal ocular condition and to the ambulatory treatment, as opposed to rest in bed.

5. The author presents a new method of treatment of retinal detachment, the retina being held splinted into apposition with the chorioid, after complete aspiration of the subretinal fluid, by an immediately-following or simultaneous injection into the vitreous of an amount of normal saline solution equal to or slightly greater than the amount of subretinal fluid aspirated.

6. Many of the military injuries and their syndromes which involve the eyes and which appear to be traumatic novelties, will be shown to have their counterpart in civil practice, if carefully sought after.

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NOTES ON A CASE OF SYMMETRICAL LYMPHOMATA OF THE LACRIMAL AND SALIVARY GLANDS (MIKULICZ'S DISEASE).

BY

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The patient, F. O., a colored woman, aged 21 years, married, presented herself at the Wills Hospital, January 15, 1916, with the history of having noticed a swelling of the upper lids four weeks before, which became hard two weeks later. These masses caused no pain, though the lids smarted at night.

Note on Admission.—General Examination: Patient thin, rather poorly nourished, negress of very dark skin. No evidence of eruption, but dry infiltrated condition of skin around knees and extensor surfaces of thighs and legs. Mucous membranes pale. Deflected septum of nose with hypertrophied turbinates. Five or six teeth in mouth in process of decay with gingivitis surrounding the lower molars. Enlarged sublingual



Fig. 1. Enlarged Lachrymal Glands, Front View.

gland palpated through mouth. Thyroid gland considerably enlarged, right lobe more so than left.

Long narrow chest with infra- and supra-clavicular depression right side. Chest wall thin and emaciated. Heart negative. Lungs—dullness on percussion over right upper and lower lobes and left lower lobes. Tactile and vocal fremitus increased. Tubo-vesicular and strains of tubular breathing with subcrepitant rales heard. Abdomen negative.

Glandular System:—Submaxillary, axillary, inguinal and femoral glands enlarged and palpable.

Reflexes:—Knee-jerk absent right side, slight response on left side. No Babinski. No ankle clonus.

Von Pirquet—positive.

Wassermann—positive, plus 4.

Urine:—Sp. Gr. 1034 Blood:—W. B. C.—6800

Albumen—neg.

R. B. C.—4,650,000

Sugar—neg.

Haemoglobin 77%

Examination of eyes: Palpebral openings somewhat elliptical in shape. At the upper and outer angles of orbits and merging with the tissues of the upper lid, are swellings as large as a hickory-nut. Movements of upper lids, especially outer half of same, limited. The masses are hard, laminated and lobular and somewhat cartilaginous on palpation. Tumor masses correspond to site of lacrimal glands. On deep pressure it is found that they extend under the superior surface of the horizontal plate of the frontal bone, but are not continuous with the osseous tissue of the orbit or with the cartilages of the lid. Have slight motility, backward. Overlying tissues freely movable. Tumor masses are not especially tender. Superficial veins of upper lid moderately dilated. Slight limitation of upward rotation in each eye-ball; other movements unrestricted. Palpebral conjunctiva moderately injected. Eye-balls other-

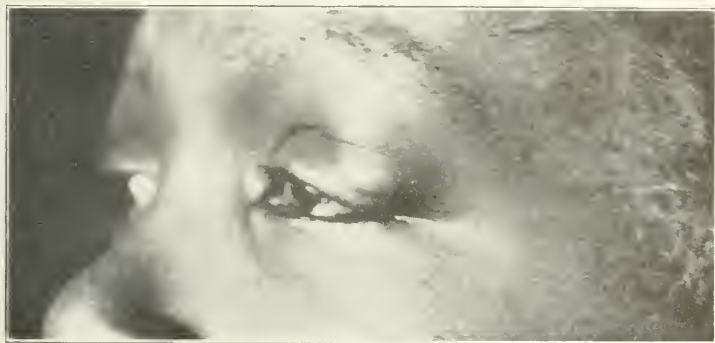


Fig. 2. Enlarged Lachrymal Glands, Side View.

wise normal. With the correction of compound hypermetropic astigmatism, vision is normal in each eye. Temperature sub-normal.

Treatment:—Supportive in nature. Special diet, milk, eggs, etc.

R—Oleum Morrhuæ, 2 drams, t. i. d.
 Bland Pill. 3 grs. “
 Hydrarg. Bichlor. 1/30 gr. “

The symmetrical involvement of both lacrimal glands, in association with enlargement of other portions of the glandular system, warranted the diagnosis of Mikulicz's Disease, as the case evidently presented the characteristic symptoms of this rare affection first described by Mikulicz in 1888. It is true that the parotids in the case under discussion, have escaped

involvement, but it is not unlikely that they may be affected later, in the event that the treatment, as so frequently happens, proves ineffective. Like all the other cases reported in this country, the patient is colored, and the eyes with the drooping curve at their outer angles, resemble, as Ziegler has pointed out, the eyes of a blood-hound.

Unlike the majority of cases in the literature, etiological factors are not wanting, for the patient is tubercular, syphilitic, and has sufficient dental decay and alveolar involvement to occasion buccal infection of the glands through the medium of the lymphatics of the mouth. Ziegler (*N. Y. Medical Journal*, Dec. 11, 1909) who has contributed the most comprehensive American monograph upon the subject, concluded that as no specific bacteria have been discovered, either in the glands or blood, the pathogenesis of Mikulicz's Disease is probably chemotactic, thus causing a localized toxic hyperleucocytosis in the affected glands. He goes on to say that toxic fluids that are chemically irritating are probably absorbed from the accessory sinuses (chiefly antrum) and transmitted through the lymphatic capillaries to these contiguous glands. He removed the tonsils and operated upon the turbinates of each of the cases reported by him, on account of their hypertrophied condition, as he argued that respiratory obstruction not only hinders the evaporation and drainage of sinus secretions, but also causes suboxidation and other disturbances of metabolism.

Neither the tonsils or turbinates in the case under discussion appeared to be sufficiently enlarged to require treatment.

In a second case studied by the writer 15 years ago, in a tubercular young colored girl, both lacrimal glands were symmetrically involved, but there was no apparent involvement of the glandular system elsewhere in the body. The hypertrophy of the glands resisted all treatment, but finally disappeared entirely without treatment after a persistence of more than a year.

An interesting phase in the course of the disease is the retrogression of the glandular swellings during the course of an acute intercurrent disease and their recrudescence in some cases after convalescence. Ziegler cites such occurrence in the practice of Kümmel during pneumonia, Mikulicz during appendicitis, Haeckel through a severe enteritis, etc., and suggests that such retrogressions are brought about by the general

disease creating a systemic polymorphonuclear leucocytosis, which temporarily overwhelms and obliterates the localized hyperleucocytosis in the affected glands.

INJURIES TO THE EYE FROM BROKEN SPECTACLE AND EYEGGLASS LENSES.

BY

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Notwithstanding the interest expressed by many regarding the proportion of injuries from broken eye glasses to the total number of individuals wearing them, there is a dearth of statistical data on the subject. The fact that writers of text books do not give much consideration to this kind of accident would suggest it to be uncommon.

As glasses are being more generally worn than formerly, and the percentage of accidents is correspondingly increased, there will doubtless be more attention given to this form of accident. We have had reports of isolated cases, or of a very small number in the whole experience of some surgeons, but little on which to base the frequency of such injuries.

In an article appearing in the "*American Journal of Ophthalmology*," November, 1915, Dr. Casey Wood states in connection with one of the few cases occurring in his practice, that his experience entirely coincides with that of Hans Lauber, published in the "*Ophthalmoscope*," Vol. 12, p. 392, 1914, who among 150,000 eye patients found this form of injury in only five cases or one in 30,000. Dr. Wood says: "It would appear *a priori* that such accidents ought to be quite common when one considers the various knocks and other injuries that the face and orbital region receive from time to time, and the not unusual fracture of glasses when worn in front of the eye." He adds: "It must be remembered, however, that the eyeball is unusually well protected from injury considering the prominent place it occupies as part of the exposed face."

After some investigation Hans Lauber concludes that the forces which cause such accidents are mostly severe and of a kind to which the eyeball is exceptionally exposed. Praun asserts that injury from eyeglasses almost always results from explosions. This is doubtless correct regarding protective glasses in industrial labor.

Dr. Harold Gifford contends that glasses protect the eyes

when worn in agricultural pursuits, which, in a broad sense, claim the largest force of industrial workers.

We, as ophthalmologists, are frequently asked by patients for whom we prescribe lenses as to the danger of wearing them under certain surroundings, or by parents in the interest of their children, if there is danger to the eye from glasses while the latter are engaged in play.

The foregoing and other considerations suggest the following queries:

1. Are injuries from broken glasses frequent, rare or very rare?
2. Do such injuries result oftener from spectacles or from nose glasses?
3. Do such accidents occur oftener in men than women?

In order to secure as much data as I could on these subjects I sent questionnaires to one hundred and thirty-five ophthalmic surgeons in various parts of the country requesting replies to these questions.

I received one hundred and two replies. Of those who responded to the question, "Do you regard the accident as common, rare, or very rare?" forty-seven reported "very rare," thirty-five "rare," and two "exceedingly rare." Three surgeons reported "comparatively rare," and only one "rather common."

The doctor who replied "rather common" gave as his reason for his answer that in many cases the damage was so slight that patients often did not seek advice. In his experience he reported but three cases of serious injury.

In reply to the question: "In your experience does this injury result from broken spectacle lenses oftener than from nose glasses?"

- 43 reported "spectacles."
- 8 reported "equal."
- 6 reported "nose glasses."
- 1 reported "rimless glasses."

In reply to the question: "Does it occur oftener in men than in women?"

- 47 reported "men."
- 4 reported "women."
- 3 reported "young men."
- 3 reported "boys."
- 2 reported "men and children."
- 3 reported "equal."

In my questionnaire, I requested from my correspondents a brief description of the cases occurring in their practice. Considering these case-histories it may be noted that the conjunctiva was lacerated in twenty-three cases; there was laceration of the cornea in nineteen cases; perforation of the cornea in twenty cases; perforation of the sclera in five cases; laceration of the sclera in three cases; the iris was prolapsed in nine cases, ruptured in one case, incarcerated in two cases, and torn in one case; the lens was made cataractous in three cases, extruded in one case, and dislocated in one case.

As a result of these injuries there were seven enucleations and one case of evisceration; also two cases of panophthalmitis; one case of sympathetic inflammation; one case of phthisis bulbi; two cases of irido-cyclitis as a result of glass remaining in the eyeball; and one case of serpiginous ulcer.

The cases described by Drs. Casey Wood and Alfred N. Murray are of great interest, and they will no doubt refer to the details of them in the discussion to follow. It would consume a great deal of time to describe all the cases reported. I will, however, present a general outline of some of the unusual injuries.

Dr. Wendell Reber's experience is unusual from the fact that he reports three cases, two of which were identical, in that they were caused by a baseball coming obliquely from behind and the broken glass causing perforation of the cornea and a prolapse of the iris in both cases.

The third was a young man riding in a motor car, who was thrown against his companion with sufficient force to break his spectacles and produce a perforation in the sclera back of the limbus. Fortunately the final outcome was perfect vision without affecting the integrity of the ocular structures.

All three were wearing spectacles. The refraction was not given.

One case reported by Dr. G. E. de Schweinitz, is of special interest in that a small fragment of glass has remained in the eye for a period of ten years, located down and inward, in the choroid. He reports, however, that no harm has followed and vision is normal.

Four cases were reported by Dr. Derrick T. Vail. The first, a young lady, twenty-one, wearing —S. D. struck her eye against the back of a rocking chair.

2. A man wearing —A. D. was struck by a foreign body

while at work, which penetrated the eyeball after passing through the eyelid, and carrying glass with it.

3. A man of twenty-eight years, wearing + 2, who experienced a superficial cut of the cornea while working in a factory.

4. A man, fifty years of age was struck by a golf ball, driving the right lens into the eyeball and orbit. The fragments of glass were removed ten days after the accident.

The extent of injury in these cases was not given.

A recent case of injury was reported by Dr. Frank Allport, of a man who while looking upward was struck by a falling chisel. The broken glass cut deeply into the ciliary region, which later resulted in panophthalmitis, and the eye was removed.

Dr. William H. Wilder reports one case of a broken glass injuring the eye as a result of a blow from a golf ball. Recovery followed, as only the conjunctiva and skin of eyelids were injured. He also reports witnessing a case of a boy injured by a splinter of glass from a broken lens. His recollection is that it was necessary to enucleate the globe.

Dr. Wallace Pyle also reports the loss of an eye in the case of a small child being struck by a stone fracturing the glass. In a letter, Dr. Myles Standish reports two cases, one a boy the other a woman and the circumstances relating to the accidents were similar. In both cases the patient came in contact with an object while running in the dark. He says he has always insisted that parents of children should have the glasses put in either heavy steel or gold-rimmed spectacle frames.

Dr. W. A. Shoemaker of St. Louis reports three cases. The first was that of a young woman wearing pince-nez glasses, who was struck by a golf ball, which produced a superficial wound of the cornea.

The second patient was struck in the eye by a racquet ball while wearing spectacles with rims producing a contusion of the cornea and rupture of the iris. Recovery followed. Dr. Shoemaker contends that if he had been wearing rimless spectacles he undoubtedly would have lost his eye through perforation of the globe.

His third case was that of a man wearing rimless lenses who, while wrestling with a friend in a pool room, struck his

eye on the corner of a pool table, producing a perforating wound of the cornea and sclera, for which it became necessary to enucleate. From his experience he is sure that rimless spectacles and pince-nez are most dangerous.

Dr. V. C. Smith of New Orleans reports a similar experience having had three cases, all wearing rimless glasses, which resulted in superficial injuries. One was that of a woman, striking a chair; the second that of a machinist struck by a piece of metal, and the third was an injury resulting from a wrestling contest.

Dr. J. E. Weeks reports three cases, two of which are intensely interesting. The first was that of a Dr. A. B., aged forty-seven, whose eyeglass was broken by coming in contact with the end of a chair leg. The right cornea was perforated in three places, and the iris was prolapsed through two of the lesions. The patient was seen by Dr. Weeks five days after the injury. He excised the prolapsed iris, and the patient made a good recovery.

The second occurred in August, 1901. Mrs. W. M. V. H., while driving four-in-hand, was struck by a lump of gravel, which shattered the right lens of her spectacles, producing a perforated wound of the cornea. Some particles of the dirt being carried into the vitreous chamber, he excised the shred of vitreous, and replaced the iris, removing particles from the wound. A violent inflammation followed but recovery took place with a circular, free pupil.

The other case was an injury to the cornea, which was superficial and no impairment of vision followed.

Dr. Wilson Johnson reports a case occurring May, 1909, of a man who was struck by a foul ball during a game. The right lens was broken, producing a superficial wound of the cornea and also penetrating the sclera. The scleral wound was 5 mm. long in the upper and inner side. Vitreous was full of blood. The wound was sutured, and the vision gradually returned to 6/6, although there was a rupture of the chorioid in the upper and inner side of the disc. However, in August, 1914, five years later the vision was 1/45, and the patient saw only part of an object. There were a number of large and small vitreous opacities, and slight retinal detachment.

About twenty-two years ago, Dr. Melville Black was called to the Denver Athletic Club, to see a young man who while

playing was struck in the eye by a small hand ball. He was wearing strong minus lenses in spectacles frames with rims, and a piece of glass had cut the cornea causing a large penetrating wound into which the iris protruded. This was pulled out and excised. The cornea healed with moderate scar and good symmetry. The lens was not injured and there was almost complete absence of the iris, with fair vision.

He saw another case last February with the following history. The right eye was injured October 25th, 1906, by a snow ball breaking the glasses and cutting the right eye. The left eye was attacked by sympathetic inflammation, December 3rd. The right eye was enucleated December 7th. Status presens O. D., prothesis-oculi. O. S., sclera negative. Cornea had a milky haze. Iris bombé. Vision, light perception.

Dr. E. N. S. Rinqueberg of Lockport, N. Y., reports two cases showing to what extent the eye might be injured and yet recovery quickly ensue.

On the tenth of June, 1915, a plumber was struck by a chunk of cast iron pipe. He received one shallow corneal cut, nearly central, crossing upper portion of pupil, and one small cut midway between pupil and inner corneal margin. The third cut was deep, crossing the lower part of cornea horizontally, and obliquely downward through the cornea to the membrane of Descemet. The corneal-sclera cut ranged from 2 mm. below the central part of the above cut, and extended obliquely inward and slightly down for a distance of about 10 mm. into the sclera, the sclera cut being deepest, so that the choroid could be seen through it. Conjunctival tear at inner canthus was three cornered and about 3 mm. across. Two pieces of glass were removed from the eye and a small spicule from the lower lid margin. This all happened on June 10th and on the 26th day of the same month he was refitted and returned to work.

In another case a man was struck by a chisel which broke a lens and the patient received a deep cut in the cornea, extending from about the lower pupillary margin downward, into the sclera, about 8 mm. long. It was directed obliquely inward, and deep enough to include a fragment of glass 6 mm. long by 4 mm. wide. It could not be seen, but was found with a probe and lifted with a spud, as were two other minute pieces. In twenty-four hours the cut was partly united; healing was uneventful, and accompanied by little reaction.

Dr. Geo. E. Blackham of Dunkirk, N. Y., reports a case of a boy, fourteen, who while playing fractured a rimless lens, resulting in a cut of the left cornea through the upper temporal quadrant. Anterior chamber was found empty and the iris prolapsed. He replaced prolapse, instilled eserine and recovery was uneventful in a week.

Dr. H. S. Miles, of Bridgeport, Conn., reports three cases, the first, a doctor watching a machinist repair an auto, was struck by a piece of iron, size of finger, breaking spectacle lens, and driving splinters into the cornea and anterior chamber. Prolapse of iris. Several small pieces of glass were removed. He recovered with V. 20 30.

The second, a doctor, was injured by a nail which he was driving forcing several pieces of glass into the eyeball, one of which was not recovered. The result was irido-cyclitis and the eye was enucleated.

The experiences of some doctors are found to be rather distinctive, as in the reports of Dr. Guy L. Noyes, of Columbia, Mo., and Dr. Louis Ostrom, of Rock Island, Ill. Noyes' cases were confined to several injuries from golf, tennis and baseballs, that occurred among the faculty and student body of the University of Missouri.

Ostrom's cases were those of injuries from air-rifle and -ling shot bullets. He mentions twenty or thirty cases of this nature. He found that the fine chips of glass in the structures were not easily located, and he believes it is better to let them remain, until local irritation reveals their exact location. He is also of the opinion that some of these eyes would have been lost by penetration if the object had not been deflected by the glass.

Dr. Carl Fisher, after looking over the records of the Mayo clinic for the past seven years, reports two cases, one a traumatic cataract, from a corneal cut, and the other a corneal wound with incarcerated iris.

A partial list of the doctors who reported only superficial injuries to the lids or no serious injuries are as follows:

Dr. Frank C. Todd.

Dr. Harold Gifford.

Dr. Dunbar Roy.

Dr. H. V. Würdemann.

Dr. W. L. Pyle.

Dr. S. D. Risley.
Dr. Kasper Pischel.
Dr. W. T. Shoemaker.
Dr. Horace M. Starkey.
Dr. John A. Pratt.
Dr. Hiram Woods.
Dr. J. A. White.
Dr. F. H. Verhoeff.
Dr. Lewis H. Taylor.
Dr. H. M. Weed.
Dr. Louis C. Wessels.
Dr. Albert E. Bulson.
Dr. Nelson M. Black.
Dr. Joseph L. McCool.
Dr. Lucien Howe.
Dr. Lee Masten Francis.
Dr. W. R. Fringer.
Dr. Burton Chance.

The most significant conclusions to be drawn from the number of cases reported in reply to the questionnaire are:

1. That in proportion to the entire practice of one hundred and two ophthalmologists, serious injuries to the ocular apparatus from broken lenses are very rare.

2. That rimless spectacles were worn in the greater percentage of injuries reported would indicate them to be less safe than other styles of glasses. This result is attributable to the fact that spectacles occupy a fixed position, and the rimless lens is more easily shattered. In the case of nose glasses, which are more easily knocked off the face, the chances of the eye being lacerated are less.

3. In most of the injuries reported the presence of minus lenses is noted. This is doubtless due to the fact that the centers of many minus lenses are not only so thin that they are often punctured by the ordinary force of cleaning, but also because they form a cutting edge so to speak, with the sharp edges immediately in front of the pupil. The opposite is true of convex lenses, as they afford a rounded surface, a greater thickness of center, and altogether tend to deflect a flying object.

4. That glasses are a protective element rather than a menace is clearly shown by these reports, although the refraction has an important bearing upon that question.

5. It is well recognized that injuries do occur in which the glass no doubt adds to their severity because of its lacerating nature, but it is demonstrated that the advantages of glasses far outweigh this remote risk of added injury, and when we consider the nature of the force that usually causes these accidents, we can be reasonably sure that the eyeball would have suffered severe injury even though the glass had not been present.

6. That the eyeball can be severely injured in this form of trauma with comparatively small loss of function seems to be due to the aseptic properties of the glass.

7. The consensus of opinion that this accident occurs oftener in men than in women is perhaps due to the fact that men are exceptionally exposed to this kind of accident, in various forms of industry and while taking part in various sports.

8. Some surgeons have expressed the belief that this kind of accident almost always occurs in industrial pursuits; the reports received, however, show that the injury is often a household accident, or a result of athletic games.

ADDITIONAL FIXATION OF THE EYE, IN CONNECTION WITH THE USE OF LID RETRACTORS IN THE STANDARD CATARACT OPERATIONS.

BY

DAVID W. STEVENSON, M. D.,

AKRON, OHIO.

The Cataract operation will always remain the most delicate and difficult in human surgery, because so much depends on the patient's behaviour, which may not be of much importance in other operations. The purpose of this essay is to direct attention to a plan, by which the importance of the patient's behaviour will be reduced to the extreme minimum.

At the present time, it can be said that fully 95% of all the standard cataract operations are performed with the use of eye speculum or blepharostat especially when the primary incision is being made. This undoubtedly is due to the fact that when eye retractors are used, the lids are lifted from the eyes and the support of the lids during the incision is grievously missed, as one point of fixation is not enough to prevent the eye from rotating or from being displaced. Yet many of the world's best oculists have had catastrophies immediately follow-

ing the incision, due to spasm of the orbicularis and to lack of control in the patient. When we remember that many of our aged cataract patients have arterio-sclerosis, diabetes and nephritis, in connection with latent choroiditis and retinitis, the wonder is that there are not more such calamities. I have witnessed an apparently self-controlled patient, under such a skilful operator as Dr. Hotz of Chicago, persistently squeeze the eye following the incision, until all the vitreous was lost. The use of profanity will never prevent such accidents! It would be better if in all cataract operations the eye-speculum were permanently discarded during the whole procedure.

Of the many eye retractors on the market, I believe Dr. Fisher's fenestrated upper-lid-retractor in conjunction with his lower lid hook, will be found as satisfactory as any. The nurse, who holds the upper retractor by the thumb, at the extreme end, and who has the palm of the hand at the vertex of the patient's head, is entirely removed from the operator's field. It is only when the lens is being expressed, that the handles of the retractors are elevated, so as to draw the lids upward and out of the orbit. The lid retractors are used continuously throughout the operation. They can easily be removed at the end of the operation, especially with the aid of a Smith hook placed at the side. Only one retractor is removed at a time, and the lids are kept close together. Previous to removal, the conjunctiva is irrigated and White's Bichloride Ointment is freely applied. Before the primary incision is made with the Graefe knife, an assistant will seize the eye with a fixation forceps, just below the cornea and very slightly to the temporal side, and will pull the eye forward in line with the optic nerve. This traction elevates the eye, so that there is greater space for movement of the Graefe knife, and, a fact of still more importance, it deepens the anterior chamber, so that there is never any danger of the iris floating before the knife. The section in the cornea is not made by to and fro movements, which draw out the iris, but by alternate pressure on one side of the cornea at a time. The surgeon will use a second fixation forceps to the nasal side, applied 90 degrees from the other. A cotton stick applicator might do as well as it is used only to steady the eye: at least the surgeon's fixation forceps do not require teeth, but only smooth serrations similar to Allport's fixation forceps.

If only one fixation forceps is used the following conditions will generally be found:

1. A very firm grip is taken in the conjunctiva, episclera, or sclera.
2. The tissues are apt to be twisted, bruised, and lacerated, which condition is more apt to be followed by infection.
3. The fixation forceps is used as a pry to prevent rolling, thus increasing the tension leading to entanglement of the iris, or worse still to a loss of the vitreous.

These three complications are obviated by the method proposed, additional fixation, with the continued use of the retractors. The iridectomy, capsulotomy, and toilet are performed in the usual manner. During expression of the lens, the handles of the retractors are held so as to be close together, and there is a large open space under the upper lid. This method with double fixation is as useful in the simple as in the combined standard operation. It is especially beneficial in Homer Smith's operation, where the eye has been rendered in some cases particularly sensitive by the preliminary capsulotomy.

From four years experience in China, followed by nineteen years practice in ophthalmology in America, I believe it easy to prove that the average assistants are able to take their part satisfactorily in the method advised in this paper. So firmly is the opinion held that this furnishes the safest cataract procedure known, that if compelled in the future to submit to a cataract extraction, this is the only form I would permit in my own case.

I do not believe in the intracapsular operation. I have witnessed a great many operations performed by the late Dr. Green, of Dayton, as well as by others, and I have seen a number of bad after effects. Such an operation will always result in more vitreous loss, to be followed by slow degeneration, iridocyclitis, detachments and hyalitis as well as by other complications.

ERRATUM.

On page 199, line 18 of Dr. S. R. Edward's article on trachoma, published in the April OPTHALMIC RECORD, the word magnet should be substituted for X-ray.

A CASE OF CHOKED DISC WITH RAPID DESTRUCTION OF SIGHT AND SUBSEQUENT IMPROVEMENT.

BY

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Patient.

Mr. Shin Por Ming, age 26, came to the office Oct. 19, 1913, complaining of complete loss of sight in the right eye in four days time. Sight in the left had also become so poor in the last two days that he could not walk about unaided.

History.

The patient, a widower, has three children, all living and well. His wife died three years ago, cause unknown. She had had no miscarriages. The patient's mother is still living and in good health. His father died when he was four years of age. He has always been well except for some trouble with his teeth and right upper jaw which is yielding to treatment by a dentist. He drinks Chinese wine only at feasts. He is also in the habit of taking Japanese beer at such times. He smokes six foreign cigars a day and has used opium as often as three or four times a year but none just recently. He has had gonorrhea but denies syphilis.

Present Illness.

Four days before the present examination the patient noticed the sight was diminishing rapidly in the right eye. There was no other symptom aside from the rapid loss of sight. Two days later the same condition began in the left eye. The patient had to be led into the office.

Physical Examination.

The patient is a well developed Chinese of about 150 lb. weight, in good health. Examination of the eyes showed marked dilation of the right pupil which did not react to light. He could not distinguish objects or light with this eye. The left pupil was two-thirds dilated and reacted slightly to light. Objects the size of a watch could be distinguished. There was no increase in tension in either eye.

Ophthalmoscopic Examination.

The right eye showed a marked choked disc. The veins were enlarged and tortuous while the arteries were faint and in places seemed entirely empty of blood. There was no hemor-

rhage or inflammation in the retina. The left disc showed considerable swelling but not enough to completely obliterate its outline. Here also the retina was not involved.

Treatment and Course.

The patient was sent immediately to the hospital and a lumbar puncture done. The cerebro-spinal fluid flowed rapidly and in a very short time 130 cc were removed. Almost as soon as the fluid began to flow the patient complained of headache for the first time. The pain in the head became so severe that it was thought best not to remove more fluid, although it was flowing freely.

The patient's bowels were moved with enema, and hot bottles were put in his bed to make him perspire freely.

Oct. 20. Blindness increased in left eye. Patient was much depressed with pain still in the head.

He was sent for X-ray examination of the cranial cavity.

Ophthalmoscopy examination showed the right disc about the same. The left disc was more swollen.

Oct. 21. Patient almost totally blind in left eye. The disc of this eye was more swollen and the outline was completely lost. The right disc was not so swollen.

The skiagraph was negative.

Wassermann tests of blood and cerebro-spinal fluid were negative. A second lumbar puncture was done but only a few drops of fluid obtained after entering the canal at two levels.

The patient was put on 30 grains Potassium Iodid four times a day together with mercurial inunctions.

Oct. 22. Sight was entirely gone in left eye even for strong or ordinary daylight.

Right fundus was improving, while the left remained the same.

The pain in the head has continued since the first lumbar puncture, but is not severe except when sitting up.

The patient vomited for the first time after being given fifteen minims of nux vomica in water. The vomiting was probably due to the medicine.

Oct. 23. No marked change except that the right fundus was less swollen.

Nux Vomica was given in carbonated water without a recurrence of the vomiting.

Oct. 24. Right disc much improved. The left was the same. Headache continued.

Oct. 25. More improvement of right disc. Left disc was not so swollen.

There was lachrymation of the right eye produced by examining with electric light, but no vision for light or objects.

Oct. 26. Disc outline began to appear on the right eye. The left showed improvement.

The lachrymation was much greater during the examination on the right. There was slight lachrymation on the left.

Oct. 27. Patient saw a finger when moved close to the right eye on the nasal side, if the eyes were turned away from the light. A small electric light placed in the same position was not distinguished either as a light or as a moving body.

Both discs continued to improve.

Oct. 28. The disc outline was made out for the first time on the left. Vision about the same for the right eye.

Oct. 29. Patient saw a moving finger when placed before the left eye, in the same position, and under the same condition as before the right eye two days before. There was the same inability to see the electric light as with the right eye.

The swelling on the left was receding, while on the right it seemed practically to have disappeared.

Oct. 30.-Nov. 3. Daily improvement in vision was marked. Daylight and electric light distinguished.

Objects placed a few inches from the eyes were seen when moved. The iris reacted to light slightly in both eyes. Somewhat more, however, on the right.

Subsequent History.

The vision improved rapidly for four or five weeks and then seemed to go more slowly. At the present time the patient is able to walk about the streets of Shanghai by himself, and can see Chinese characters three inches high two feet away. Objects directly in his line of vision are not as distinct, however, as those immediately outside. This is entirely consistent with the appearance of his optic disc. The periphery is pink, while the central portion shows considerable atrophy.

This case aside from the problem of diagnosis is of interest because of the rapidity and complete temporary loss of sight with subsequently a fair return of vision. A number of other points of interest are given below.

The patient was absolutely blind in each eye for a period of about ten days.

The large amount of spinal fluid obtained on one day, and practically none obtained two (2) days later.

Lachrymation was the first sign of improvement.

When improvement began strong lights were not perceived, whereas dimly illuminated objects placed away from the light were.

HERPES OF THE CORNEA AS A COMPLICATION OF INFLUENZA, WITH REPORT OF A CASE.

BY

C. W. WALKER, M. D.

YORK, NEBR.

The occurrence of herpes of the cornea during epidemic influenza, while not unusual, is a condition which is not frequently met with, at least in this country. The case which I am reporting in this paper led me to communicate with several oculists in different parts of the country, as to the occurrence in their practice, of herpes of the cornea complicating or following influenza, during the epidemic which swept over the country during the past winter. I have received reports from all parts of the country and the only cities from which cases have been reported are Philadelphia and Seattle. Dr. G. E. de Schweinitz reports a number of cases of herpetic ulcers, also other ulcers which did not seem to pertain to the nature of herpetic lesions but which followed the grippe infection. Dr. Wm. Campbell Posey reports one case of herpes and a number of ulcers of various types complicating influenza. Dr. H. B. Würdemann reports three cases.

The case which I have to report is as follows: G. P. S., physician, aged 34, previous history negative. During December, 1915, he had been treating a large number of patients suffering with influenza. On December 15th he had a severe attack of grippe himself, with the usual symptoms and with herpes of the right side of the face. On December 31st his right eye became somewhat irritated and he applied a boric acid wash. On January 1st, 1916, I examined the eye and found a foreign body imbedded in the bulbar conjunctiva. The eye was moderately inflamed and the patient was not suffering any great discomfort. The foreign body was removed and the boric wash continued. The next day the eye was very painful and the conjunctivitis became very severe. The patient was kept at home, hot compresses were applied. 25% argyrol solution

every three hours and warm boric douches used every hour. He was given an injection of syringe "A" Influenza Bacterin Mixed Mulford and five grains of aspirin every two hours. On January 5th the cornea became slightly hazy and a weak solution of atropin was used every three hours. The eye was extremely painful and photophobia was intense. The eye became gradually worse in spite of all treatment until January 8th, when the small herpetic ulcers appeared on the cornea. On that day he was seen by Dr. Harold Gifford of Omaha, who advised that our treatment, which was the usual one for ulcers of the cornea, be continued. On January 20th the ulcers were completely healed and the eye free from any signs of inflammation. The ulcers left a permanent opacity which fortunately is not situated over the pupil and consequently does not impair his vision.

One of the interesting points in my case was the short duration of time required for complete healing of the ulcer. Ten days after its first appearance, the healing was complete and the eye free from any inflammation. According to Haab, "The distinguishing feature of herpetic ulcer is the exceedingly slow healing process, requiring from four to eight weeks for its completion, which is probably due to the scant and sluggish vessel-formation."

Another point of interest was the time which elapsed between the appearance of the conjunctivitis and the development of the ulcer. As a rule the ulcer develops within a day or two after the first signs of inflammation in the eye, but in this case nine days elapsed before the herpes developed.

In none of these cases nor in the case which I am reporting was the influenza bacillus demonstrated but I feel confident from the history, at least in my own case, that the herpes was due to the toxins or endotoxins of the influenza bacillus, although according to Axenfeld-MacNab, "We have no information certainly pointing to a micro-parasitic etiology of the herpetic infections of the cornea."

New and Nonofficial Remedies. Containing Descriptions of the Articles Which have been Accepted by the Council on Pharmacy and Chemistry of the American Medical Association Prior to January 1, 1916. Cloth. Price, postpaid \$1.00. Pp. 428—xxii. Chicago. American Medical Association, 1916.

REPORTS OF SOCIETIES

COLORADO OPHTHALMOLOGICAL SOCIETY.

H. R. STILWILL, M. D., PRESIDING.

FEBRUARY 12TH, 1916.

Lime Burn of Eye.

Dr. W. H. Crisp presented a young man of nineteen years, who, three weeks earlier, while bearing down heavily on a whitewash spray pump, in order to overcome an obstruction in the hose, had separated the hose from the pump and squirted the whitewash into his right eye. A portion of the whitewash, which had been freshly mixed from unslaked lime, had remained for nearly an hour in the upper cul-de-sac. The upper cul-de-sac was already completely obliterated, the upper tarsus concave inward; the lower cul-de-sac in fairly good condition, and the cornea, the cloudiness of which had steadily increased, was becoming gradually encroached upon by the red and thickened conjunctiva. Was there any prospect that this eye would retain sight?

DISCUSSION.

Dr. E. M. Marbourg found olive oil, to give the best results when used immediately.

Dr. D. H. Coover said that he was accustomed to the use of egg membrane to prevent adhesions forming.

Dr. Melville Black: The worst burns are usually from lime, caustic soda or potash. Recalled a case of a boy who was making a volcano with unslaked lime; result of the eruption was the worst burn of an eye that he had ever seen and hopeless loss of the eye. In bad cases there is nothing that can do much good.

Dr. Edward Jackson believed that the final result of the case shown by Dr. Crisp would be bad.

Dr. W. C. Bane said that some five years ago he had seen a boy who had put lime in a can—there was an explosion and both eyes were destroyed.

Bullet Injury of Eye.

Dr. W. H. Crisp presented a boy of six years who three weeks earlier had been shot in the right eye with a bullet fired from a homemade cannon, the essential part of which was a sawed off .22 rifle. The bullet had split the cornea and sclera into a number of triangular flaps, and had apparently passed

through the eyeball, glanced against the bone at the upper part of the orbit and passed downward through the cheek to reach a final resting place behind and somewhat internal to the angle of the right jaw. The general course was shown on an X-ray plate by a number of small fragments of lead which had been left in the track of the bullet. The eyeball was now greatly shrunk and sunk deeply into the orbit. Was it in any way desirable or advisable to retain the shrunk globe?

DISCUSSION.

Dr. Black thought that it would have been good practice to have eviscerated contents when the case was first seen.

Dr. J. A. Patterson believed that Wilson's policy, at the time of the injury, was safer for the boy, but at this time enucleation was the proper thing.

Dr. Jackson said that the injury was similar to injuries now occurring at the seat of war and spoke of the custom of removing foreign pieces lying just in front of the optic nerve not, however, opening its sheath. He believed that enucleation should be done in this case.

Glaucoma:

Dr. W. F. Matson presented Mrs. N., aged 52. Feb. 8th, 1916. tension of right eye plus 3, that of left eye plus 1.

Pupil of right eye widely dilated, that of left eye 4 mm. Pupils do not react to light. Right eye very painful, left slightly so. O. D. V. fingers 20 inches, with the vision of the left eye still good. History of pain and loss of vision in right eye for one week. Diagnosis—glaucoma, and as the condition has been steadily improving under the instillations of eserine, operation has been deferred. Dr. Matson asked—should iridectomy be done on the right notwithstanding the benefit being derived from the use of eserin?

DISCUSSION.

Dr. Coover said that he could see no harm in doing an iridectomy and Dr. Black advised giving a good, liberal subconjunctival injection of sol. sod. cit. in order to get the eye in the best condition possible for operation.

Atrophic Changes in Both Eyes.

Dr. W. C. Bane presented Mrs. G. H. S., age 56. Patient was first examined April 2nd, 1902. At that time vision of the right eye was 6/6, with contraction of the nasal field. The left eye could see but part of the hand at one foot, the nasal field

being blind and the temporal field limited to 40° . Pupils were equal and responded to both light and accommodation. Vision of the left eye had been failing for two years; no pain; no floating opacities. Tension of left eye slightly elevated. There was marked glaucomatous cupping of both discs, the right equal to -4 D. and the left to -5 D. Patient had occasionally noticed halos about artificial lights.

Patient was again seen Aug. 24th, 1913, at which time he came because of impaired hearing. He stated that he had not been able to see much after September, 1902, and that since March, 1903, he had been totally blind. Examination in 1913 revealed both pupils widely dilated and no vision in either eye. Right iris was devoid of part of its epithelial layer. Left lens dislocated and resting in the floor of the pupillary area.

Examination on February 12th, 1916, shows increase of the atrophy of the right iris. Right lens has been absorbed, the shrunken capsule of which can be seen resting back of the lower portion of the iris. Left lens is freely movable and gravitates to the most dependent portion of the eye. Illumination reveals nothing but a white eye ground.

DISCUSSION.

Dr. Jackson: In some cases of atrophy of the iris the cause is obscure but in this case the dislocated lenses would account for the atrophy. Such cases show the importance of removing the lens when it first becomes dislocated.

Dr. G. L. Strader spoke of a case of glaucoma in which atrophy of the iris had taken place, though considerable vision remained.

Congenital Entropion.

Dr. W. C. Finnoff showed a baby two years old that had had entropion of both lower lids since birth. The right had now recovered and the left was getting better as a result of using applications of collodion to hold the lids in position.

DISCUSSION.

Dr. Black had some doubt as to whether this could properly be termed a congenital entropion as he thought that it might be due to a skin fold. He said that in using collodion for such purposes the flexible collodion should be used.

Dr. Crisp said that he had a case with corneal trouble which caused the patient to keep the eye closed and that it soon got so that there was inturning of the lower lid, for which

he applied adhesive plaster and soon corrected the trouble.

Dr. J. J. Pattee stated that he had had a case of entropion which was associated with and probably due to phlyctenular conjunctivitis.

Dr. Finmoff in closing said that but two cases of congenital entropion had been reported in the last ten years.

Retinitis Proliferans.

Dr. Melville Black: You will all remember this case of proliferating retinitis in his left eye, and when we saw him two months ago his right eye had vision of 20/30 and there were evidences of a neuroretinitis with hemorrhages above the macular region. A study of this case since that time has been most interesting. There has been a gradual change going on and sometimes these changes were so rapid and so marked as to become almost kaleidoscopic. His vision has been reduced for possibly four weeks to about 20/200 and sometimes as low as 10/200.

There has been a gradual tendency to the formation of new vitreous membrane, and it has only been within the last few days that evidences of vascularization are apparent. You will observe that by following the superior right vein to a distance of about three disc-diameters above the disc, that there is a reddish blanket into which this vein disappears. This blanket is some six dioptries in front of the retina. Running downward from this point across the disc is a string of membrane which contains fine blood vessels. This string or isthmus, connects with a membranous vascularized blanket which lies over the whole lower portion of the fundus and obscures a large portion of the disc. There are evidences of some fresh hemorrhages in this membrane below, as well as blood vessels.

The right temporal region of the eye is very poorly seen and this is undoubtedly due to beginning membrane formation. There is a large vein with its accompanying arteries which can be followed from the temporal margin of the disc in an upward and temporal direction until it disappears in the membranous exudate above.

The opportunity of watching a case of retinitis proliferans through its early stages is so unusual that this presents the possibility of study in this particular rarely afforded us.

He has marked general and focal reactions to tuberculin. I have been giving him of late 1/16 of a milligram of O. T.

once a week, and have not found it possible to get very much above that dose without its producing a general as well as focal reaction. There seems to be no question, in my opinion, that this condition is tuberculous, notwithstanding that this young Irishman is in the pink of apparent physical condition.

With regard to the left eye; the massive exudate still occupies the whole nasal half of the fundus with a very sharp line drawn along the temporal border, which drops off like a precipice down to the normal retina level. The only change that has taken place in this massive exudate is the appearance of vascularization, which varies more or less every time that I examine it. On the whole, I believe there has been some improvement in this eye.

The case will again be presented for your further consideration and study.

Vitreous Hemorrhage.

Dr. H. R. Stilwill presented W. W. D., age 43. Occupation, carpenter. First seen on Dec. 14th, 1915. Complains of inability to see well in left eye for the past three weeks. Examination: Vision of left eye is fingers at 4 feet, and best seen from the temporal side. A large hemorrhage, in the vitreous, to the temporal side. Family history negative. No history of injury. No lues. No T. B. Urine negative. Patient apparently in good health. The vision is gradually clearing and at the present time, Feb. 12th, 1916, is $4/5$. R. E. normal. Case is presented for opinions as to etiology.

DISCUSSION.

Dr. Black suggested that a tuberculin test be made. Dr. Bane thought it to be an idiopathic vitreous hemorrhage and that it would clear up under pot. iod.

Dr. Jackson stated that he believed all vitreous hemorrhages, other than those due to trauma, to be of tuberculous origin.

Dr. Crisp suggested that the vision be taken before and after making tuberculin test.

Glioma.

Dr. J. J. Pattee reported the following case. On October 15th, 1915, I was consulted with regard to the right eye of H. D., age 3 years. He is a twin, his mate being a healthy boy. Family history negative so far as serious eye affections or tumors are concerned. The mother informed me that two

months previous to their visit they noticed that the child's right eye was a little bloodshot. She said that the color of the eye had changed slowly until about three weeks before their visit to me, when the natural color of the eye gave slowly away to a yellowish white looking substance in the eye. The parents had discovered that the child's right eye was blind, or nearly so, as far as they could tell. The patient's disposition had been considerably changed for a few weeks and he was growing more and more irritable and peevish. All symptoms were slowly progressive.

On examination I found considerable injection of the eye-ball; the cornea somewhat dull and cloudy, although not markedly so; the anterior chamber shallow; the iris slightly discolored and its figure somewhat altered; the pupil very much dilated and immobile and the tension of the eye to palpation was noticeably increased. A growth was found about the disc which produced a yellowish reflex. It was a typical picture of amaurotic cat's eye.

I consulted Dr. Philip Work, a neurologist, with reference to the general symptoms, who reported upon the same as follows: No vertigo or vomiting. No symptoms of intracranial pressure. Patient sleeps poorly and has night terrors. Headaches, but not localized. General physical examination quite negative. Reflexes normal. Differential diagnosis to be made between syphilis, tuberculosis and glioma.

I advised enucleation of the eye which was performed on November 20th. The eye was given to Dr. Carl W. Maynard for pathologic examination, who reported as follows:

Gross.

Gray fungoid mass, very fragile, covering about one-half of fundus of eye: 5 mm. average thickness.

Microscopical.

Neoplasm attached only at point where optic nerve enters eye. Tumor mass consists of branching clumps or sarcoma like cells, the masses separated by necrotic tissue. Almost no stroma between tumor cells. No neuroglia fibrils present. An occasional cell shows a differentiation toward the nerve-cell type, with axon formation. In many places the cells are grouped about an opening in which there is a tendency to the development of rods and cones. Also occasional perivascular grouping about delicate walled blood vessels. Tumor cells can be traced

into the optic nerve as it enters the eye and grouped between the fibers of the nerve stump.

Diagnosis: Neuroblastoma.

I have not seen the case since he was operated which was two and a half months ago. The family stated in a letter that so far as they could tell, the eye had healed and there has been no evidence of recurrence. The family physician has seen the child a number of times and says that the socket is clean and nicely healed. Of course it is too early to tell what the ultimate outcome will be.

Feb. 24th-16. The case returned to my office today. The socket is filled with the tumor growth so that the lids are slightly separated by a small protrusion of the tumor. The child is exceedingly peevish. The growth for the last few days has been very rapid. The family physician and parents could not detect any recurrence until four weeks ago.

Cilioretinal Vessel Taking Place of Lower Temporal Artery.

Dr. Crisp reported a case in which the right lower temporal artery was a cilioretinal vessel, not derived from the central artery of the retina. The vessel became clearly visible a short distance from the lower temporal margin of the disc, and the reflected portion, coming from the choroid, could be traced practically to the disc margin with a low minus lens.

Dr. W. M. Bane showed a beautiful slide of the Morax-Axenfeld diplobacillus.

Of much interest to those present was the removal of the tarsal cartilage with underlying conjunctiva for trachoma, and a Ziegler for entropion, performed by Dr. Coover.

E. T. BOYD, Secretary.

POLYCLINIC OPHTHALMIC SOCIETY.

DR. WM. ZENTMAYER, CHAIRMAN.

THURSDAY, DECEMBER 9, 1915.

Subject: "The Accessory Sinuses of the Nose."

Dr. J. P. Tunis (by invitation) "The Anatomic Relationship of the Eye to the Accessory Sinuses." (Abstract of remarks illustrated by forty lantern slides). The close anatomical relations between the accessory sinuses and the contents of the orbit are abundantly proven both by dissections of these parts in the cadaver and by rapidly accumulating clinical evidence. The greater the amount of anatomical material examined the

more one is impressed with the wide variation in the size and capacity of these air spaces. It follows that the larger they are the closer become their relations to the orbital contents. These observations are based on an examination of several hundred adult skulls and over five hundred wet preparations. Briefly the optic nerve or some equally important part of the orbital contents, may come in close touch with the frontal, the posterior ethmoid, the sphenoidal sinus or the maxillary antrum, by the over development of these air spaces. This can be readily proven by reference to my specimens.

The sinusitis which is most apt to cause optic neuritis develops either in the posterior ethmoid or in the sphenoid. Frequently this all important nerve may be seen occupying a canal of its own running through the posterior and outer part of either one of these spaces. The works of Onodi are particularly rich in such material. About a dozen of my lantern slides are copies of his illustrations. On one side the optic nerve may come in close relation with the sphenoidal sinus and on the other with the posterior ethmoid. In several of these specimens the optic nerve was separated from these air spaces by a tissue covering no thicker than an ordinary sheet of writing paper. In such case chronic inflammation of the sphenoid-ethmoidal space could readily infect the optic nerve.

As illustrating the great variation in the development of these sinuses let us take for example the sphenoid. As a rule the sinus develops in the body of this bone only, with an average capacity at maturity of about 4 c. c. Frequently, however, this development may extend outward into one or both of the greater wings of this bone with corresponding increase in the size and capacity of the sinus. It is in such cases that special canals for the optic nerve is developed.

Similarly one of the specimens shows such a very considerable development of the frontal sinus posteriorly as to bring it in close touch with the optic foramen. Clinically, in such cases, frontal sinusitis per se might readily have caused optic neuritis.

Chronic inflammation of the maxillary antra may extend upward to the orbit especially if these spaces are of more than average size. In this connection it is well to bear in mind the fact that patients past middle life have thinner roofs to their antra than those of less mature years. In other words as we pass the age of forty-five nature, as a rule, brings about a

gradual absorption of the bony part of the antral roof more or less, so that as age advances this separation between the antrum and the orbit becomes more and more membranous.

In this connection let me quote from an article of mine in the *Laryngoscope* for October, 1912: "Sphenoidal Sinusitis in Relation to Optic Neuritis." 1. Anatomically, the posterior ethmoid and the sphenoidal sinus must be regarded as having practically the same intimate relations with the optic nerve. 2. Infection of the optic tract by the spreading of sphenoidal or posterior ethmoidal sinusitis is due more to continuity and proximity than to any peculiar arrangement of the lymphatic system in this region. 3. Sphenoidal or posterior ethmoidal sinusitis may occur independently and unassociated with frontal sinusitis or anthritis. 4. When the sphenoidal sinus is the seat of chronic inflammation the importance of a prompt diagnosis and the institution of equally prompt remedial measures cannot be too much emphasized.

Dr. Wm. Zentmayer. "The optic nerve in affections of the sinuses." It could not be otherwise than that such a highly specialized nerve as the optic, having such a close anatomic topographic relation to mucous lined cavities should suffer at times when these cavities are the seat of inflammation. At the same time it must not be overlooked, that considerable protection is afforded by the periosteum. The analogy that one hears at times drawn between these structures and the appendix and the peritoneum to illustrate their liability to associated involvement, is not a close one, as in the latter instance we have to do with a rudimentary structure whereas in the former we have developmentally at least, normal structures.

The changes in the optic nerve manifest themselves as a retrobulbar neuritis, papillitis, of a slight degree and an actual papilloedema. The relative frequency of these conditions calculated from the case reports published recently by Elschniig shows that in unilateral cases, retrobulbar neuritis is present in 20 per cent; papillitis occurs in 55 per cent; papilloedema in 25 per cent. In bilateral cases retrobulbar neuritis occurs in 45 per cent; papillitis in 33 per cent, papilloedema in 16 per cent. This gives a papillitis in about one-half of the cases. The distinction between these groups I have based on the ophthalmoscopic findings-negative, slight haze or swelling of the papilla, and decided edema and prominence of the papilla. The visual disturbance occasioned varies from slight impairment to

absolute blindness. The onset is relatively rapid. When it is possible to take the visual field, in about 25 per cent of the cases, a central scotoma will be found, absolute in some and relative in a fewer number. The findings in the studies made of the blind spot have not been harmonious. Hoeve, who first studied them, found enlargement for color. This was confirmed by Gjessing, who found it in 50 per cent of his cases. It should be stated that lately observations would indicate that it by no means occurs with this frequency, certainly not as an early symptom. Among exceptional field findings are ring scotoma and peripheral contraction.

Dr. Wm. Campbell Posey: "Changes in the Orbit." It is now generally recognized that inflammation of the orbit of endogenic metastatic origin is rare, and that most diseases of this cavity are ectogenic, being occasioned by an inflammation of one or more of the accessory sinuses of the nose. The character of the symptoms and the form of inflammation which the disease of the sinus excites in the orbit, depends first on the particular sinus or group of sinuses affected, and secondly on the nature of the inflammation of the sinus. Thus, for example, a chronic distention of the walls of a sinus (hydrops) may occasion dis-location of the globe, with the necessary attendant of more or less functional derangement of the ocular muscles, giving rise to asthenopia or actual diplopia; or the refraction of the eye may be altered by pressure, causing changes in the axis or the amount of the astigmatism, and, finally, disturbances in the proper canalization of tears may result from a displacement of the puncta lachrymalia, or by a lesion in Horner's muscle in the lid. In chronic cases, vision is but rarely affected, for even when there is exophthalmus, the sigmoid flexure in the optic nerve permits it to elongate and escape injury from the traction to which the displacement of the globe subjects it; in acute inflammatory processes of the orbit, on the other hand, vision is apt to be more or less impaired, either from the very pronounced displacement of the globe which occurs in this class of cases, or from a direct implication of the nerve itself in the inflammatory process.

One of the earliest signs of the involvement of the orbit is a change in the contour of the orbital ring. Usually this is occasioned by a distinct projection into the orbit cells, but at times the rim may be simply raised and roughened, either wholly or in part, by periostitis. In some cases of sinusitis an

acute cellulitis of the orbit may develop without premonitory signs, and lead to the formation of an abscess which may point and discharge itself either externally through the skin of the lid, or in rare cases into the antrum, nose or tear sac. In other cases the sinusitis causes a circumscribed swelling to appear in various parts of the orbit, which may be either as hard and unyielding as bone, or may convey to the finger the impression of containing fluid.

Although it is frequently impossible by means of the ocular symptoms alone, to make a differential diagnosis of the particular sinus involved, in many cases the character of the displacement of the eye ball is of significance. Thus, disease of the frontal sinus, which is the most frequent form of sinusitis to occasion dislocation of the globe, by reason of the extreme thinness of the bone which separates its cavity from the orbit, causes the eyeball to be displaced down and out. Mucocceles formed from the ethmoid cells are circumscribed, and do not as a rule, occasion any considerable diminution in the size of the orbital cavity; when displacement of the globe does occur, however, it usually is up and out. Dislocation from a mucocoele of the sphenoid cells is uncommon, as in the rare cases in which mucocoele develops in these sinuses, the anterior wall, being the thinnest, is the first to give way and the orbital cavity escapes compression. The orbit enjoys a similar immunity in hydrops of the antrum, for the inner wall of these cells is the thinnest and is the first to yield, and the nasal cavity is encroached on. Proptosis always indicates pressure from behind the globe.

The location of the pointing of the abscess may also be of value as indicating the particular sinus which is affected; abscesses of the frontal sinus tending to perforate at the middle of the upper lid, or at the superior angle of the orbit, and those due to ethmoiditis at its lower inner angle. A general orbital cellulitis may be occasioned by an acute perforation of any sinus. Disease of the frontal sinus may be frequently diagnosed by redness and swelling of the skin over the sinus, and by the pain which may be elicited by pressing on the roof of the orbit in the neighborhood of the pulley of the superior oblique muscle; indeed it is often possible to outline the area of the sinus by noting the extent of the tenderness.

Dr. Zentmayer (closing): It is to be regretted that time

did not permit Dr. Tunis to refer to the anomalies met with in the accessory sinuses. In a recent paper on "Contralateral Visual Disturbances," Onodi described instances in which the sphenoid sinus is separated from the homolateral optic nerve by a dense plate of bone, but is in contact with the optic nerve of the contralateral side; also an instance in which the two sinuses are superimposed; also one in which the left sinus is in contact with the right optic nerve.

It would seem reasonable to suppose that a sinusitis could produce a uveitis through absorption of toxins just as a focus of pus anywhere in the body may be responsible for a polyarthrititis.

Dr. Reber's statement that a bilateral lesion indicates a systemic cause whereas a unilateral lesion points to a local cause is not borne out by Elschmig's series as he had more bilateral than unilateral cases.

WALTER W. WATSON,
Secretary.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

P. N. K. SCHWENK, M. D., CHAIRMAN.

JANUARY 4, 1916.

Dr. Santos-Fernandes, of Havana, Cuba, as a guest of the Society, addressed the members as follows:

Gentlemen: It is the source of the greatest gratification in my life to appear before this cultured Society, which counts among its members so many competent leaders in Ophthalmology in a city like Philadelphia, which may be considered, if not the cradle of the study of diseases of the eye, certainly one of the centers where this branch of medicine was first practised as a true science.

I owe a great debt to American Ophthalmology, which I will try to pay by making known among the Spanish-speaking scientists the many talented practitioners of this nation who devote themselves in the right way to the study of Diseases of the Eye.

In October, 1909, I was agreeably surprised by an invitation from the American Academy of Ophthalmology and Otolaryngology to speak at their approaching convention, also gracing me with honorary membership in that body, and extending to me the courtesy of being its guest while the sessions

last. I knew that for over three decades and a half, I had been a constant laborer in the ophthalmological field, publishing during that period over four hundred papers on ophthalmic subjects; but as in doing so I was only obeying a natural inclination for the studies to which I had been entirely confined since my youth, I believed that there was nothing extraordinary in my work and felt, therefore, greatly obliged to the American oculists that had so distinguished me, a colleague of a distant locality, the Great Antilles, far removed from the busy scientific centers of the American Continent. During the year that has just ended, I have begun to pay this debt to American ophthalmologists in my own way, by publishing, after four months spent in New York, two extensive pamphlets detailing the work of those who practise ophthalmology in that great city, and who also excel in ophthalmometry. More recently, in my paper for the Second Pan-American Scientific Congress, now being held in Washington, I believe I have shown that the great majority of American operators, in the operation for cataract, without apparent agreement, have derived inspiration from the great work of Daviel, the Extraction of the Cataract, and have equally preserved the memory of vonGraefe's genius, the iridectomy. At the same time, they have made all possible use of the modern advances of medical science in general; such as those of antiseptis, derived from the development of bacteriology, those of local anesthesia, which facilitate so much the surgical maneuvers, as well as the irrigation of the anterior chamber, the cutting of the conjunctival flap, the improvement of the dissection of the capsule, etc. For all these advances, to protect the eye against all eventualities after the best operation for cataract, I believe that the most generalized operative procedure in the United States ought to be called, for many reasons, "The American Method for the Extraction of Cataract."

My task in the future, I repeat, will be to become better acquainted every day with the American progress in ophthalmology, in order to write, when the opportunity arrives, the history of ophthalmology in the United States; and, later on, to write in English about the progress attained in the same branch of medicine in Spain and the Spanish-American countries. In this way, I shall be able to reciprocate the kindness of which I have been the recipient, which has deeply stirred my gratitude. I will endeavor, in time, to unite, with the noble and disinterested bond of ophthalmic science, peoples that, al-

though speaking different languages, feel, in truth, as one, through the brotherhood that professions establish among men of pure heart.

Please accept, illustrious colleagues, on this occasion, my most sincere and fondest expression of respect and fraternal affection.

Embolism of Superior and Inferior Retinal Artery.

Dr. Burton Chance reported what he believed to have been a temporary obstruction of the central artery, affecting both the superior and inferior branch—this obstruction having practically disappeared. The patient, a woman of thirty-three, who had been married eleven years, had come to the hospital on December 2d, with the statement that while going about her household duties, on November 27th, and while in the act of sweeping, she had become suddenly blind in her left eye and that, since then, the degree of blindness had remained unchanged.

When examined, the entire retina was edematous, and the disk markedly swollen. As the patient was pregnant, at about the fifth or sixth month, and had been unwell in the early weeks of this, her fifth pregnancy, it is deemed wise to refer her to her family physician, whose report, furnished several days later, was entirely negative as to renal complications.

At the first visit concentrated solutions of magnesium sulphate were ordered, and the bichloride of mercury in Basham's Mixture. At the second visit, the patient reported that her urinations had been most copious on the use of these preparations. The fundus showed a remarkable change, the diffuse edema having subsided; but over the areas supplied by the superior and inferior temporal arteries, there was a marked ischemia, as depicted in a water-color sketch shown by Dr. Chance, which had been made by Miss Washington on the morning after the second visit.

The central vision had been, and still remained, 6/9; but the peripheral field was cut down to a half-circle, extending to about ten degrees above the horizontal. In the succeeding weeks, the ischemia totally subsided. There did not seem to be any marked changes in the vessels when the patient was exhibited, other than their calibre was less than that of vessels in the nasal section. The nervous elements were undoubtedly atrophying. The fundus of the right eye was healthy throughout, the acuity of the vision being at 6/5.

Microphthalmos.

Dr. Chance then exhibited a girl of nine whose left eye was micro-ophthalmic and converged upward and inward, also showing a degenerated lens, or what Dr. Chance said was probably only the calcified capsular remnant of a lens, to which were attached three iris bands that he believed to be the remains of the iris membrane. One of these bands, extending from the lower nasal quadrant, was quite vascular, the vessels being continuous with those of the iris, or, rather, running out from the substance of the iris. The vessels were expanded, and appeared quite distinctly on the capsular surface. Light-perception was prompt, and there was a good candle field.

The right eye was normal in all respects, except for a low degree of hyperopia, which was corrected.

Dacryo-Cystitis Benefited by Ethylhydrocuprein.

Dr. William Campbell Posey showed a case of subacute dacryo-cystitis that had been benefited by the application of one per cent. of ethylhydrocuprein into the conjunctival sac, the mucopurulent character of the secretion from the sac disappearing within forty-eight hours after this solution had been used.

Delirium Following Operation for Glaucoma.

Dr. William Campbell Posey reported a case of delirium coming on about forty-eight hours after a glaucoma operation, i. e.: an iridectomy upon one, and a cyclodialysis upon the other eye. The delirium, which occurred in a neurotic Hebrew woman, assumed a violent character, but was kept in check by bromides and chloral. Dr. Posey thought the delirium similar in every way to that which occurs so often after cataract operations, and pointed out the fallacy of attributing the mental aberration in all cases to the use of atropine; for in this case of glaucoma, no atropine was used. Nor was he inclined to adopt the theory that ascribes the delirium to bandaging the eyes, for he had seen mental symptoms occur after operations in which the eyes were not bandaged. He considered the intense pre-occupation the chief contributing factor in the production of all forms of neuroses after eye operations.

Sclerosing Keratitis.

A case of sclerosing keratitis was exhibited by Dr. Posey. This patient had been treated elsewhere, without avail, by electricity, notwithstanding the fact that the tubercular nodules seen in the sclera and cornea were, in Dr. Posey's opinion, most

significant of tuberculosis. Tuberculin was administered internally, and a reaction obtained with 1/250 mg. Under two weeks of gradually increasing doses, the eye had cleared markedly.

The Use of Tuberculin in Tuberculous Iritis.

Dr. William Zentmayer showed a patient, aged seventeen years, on whom he had operated for convergent strabismus, five years before. There had resulted an orthophoria, with perfect binocular vision.

At that time, he said, there was no evidence of uveitis. The patient stated that in the spring of 1915, the right eye had been inflamed and painful for six weeks. She was not seen until November 18th, when the eye showed the sequelae of iritis—a small pupil, a posterior synechia, a delicate pupillary membrane, no anterior chamber, and no view of the fundus; tension, —? The Wassermann test was negative; the von Pirquet, strongly positive.

When the initial dose of 1/500 mg. was given, on December 7th, the vision was 6/30. By December 30th, she had had four doses, each double the preceding one. Her vision, on January 2th, was 6/12 pt. The fundus was visible through a cloudy vitreous. She had also been taking the bichloride of mercury, gr. 1/14, t. i. d. Dr. Zentmayer thought, however, that the tuberculin had been the active therapeutic measure; as he had never seen so great an improvement, in so short a time, follow the administration of the bichloride alone.

Motais Operation.

Dr. William Zentmayer showed an Italian man, aged twenty, on whom he had performed the Motais operation for unilateral congenital ptosis, six months previously. Although the result was cosmetically excellent, the patient, who is a hat-moulder, complained that after working for a few hours, the lid would tend to droop sufficiently to interfere with his work.

Iritis Due to Metastatic Gonorrhea.

Dr. How, by invitation, showed a case of iritis due to a metastatic gonorrhea. This case was from Dr. Posey's clinic, the patient being a young man who had had urethritis a year before.

Dr. Posey said that he would rely chiefly upon the salicylates in the internal treatment. He was doubtful as to the value of antigonorrheal vaccines and bacterines, having

seen plastic exudation into the anterior chamber follow their use in several cases in which they had been employed in but moderate doses.

J. MILTON GRISCOM,
Secretary.

East Liverpool, O., Feb. 8, 1916.

EDITOR OPHTHALMIC RECORD,
No. 7 W. Madison St., Chicago.

Dear Sir:

After seeing several references to the "Harold Gifford" method of obliterating the lacrimal sac by means of trichloroacetic acid and noting that several prominent oculists are recognizing this as a good orthodox procedure in cases of this kind I wish to say that I have been using this method for over five years with perfect results. The first case was in 1910—a young Italian came to me with a long history of chronic dacryocystitis, large mucocele with fistulous opening. I had never extirpated a sac at that time but had seen it done several times in the clinics at Berlin. It seemed like a rather difficult operation at that time. Under local anesthesia I curetted the fistula down to the sac. As I had read and been told that "if a shred of the sac remains behind the operation will be unsuccessful," I was determined that "not a shred should remain" and I thoroughly cauterized with trichloroacetic acid. To make sure I filled the fistula with Beck's paste and put a pressure bandage on. Much to my surprise and relief the wound healed perfectly with only a small scar. Since that time I have performed this operation six times with more confidence and equal success. The last one was a patient past 80 years of age but the result was as perfect as the others.

HOWARD H. BEANE, M. D.
East Liverpool, Ohio.

Knighthood has been conferred by King George on Mr. G. A. Berry, surgeon to the Edinburgh Royal Infirmary.

R. Affleck Greeves has been appointed assistant surgeon in Moorfields, London: and N. Bishop Harman ophthalmic surgeon to the West End Hospital for Diseases of the Nervous System, London.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. John Gilchrist has been appointed surgeon to the Victoria Eye Infirmary, Paisley, Eng.

The Oxford Ophthalmological Congress meets at Keble College, Oxford, on July 13 and 14.

Dr. William H. Wilder of Chicago is president of the Medical Reserve Corps, U. S. A., Illinois division.

Dr. Cassius D. Wescott of Chicago is spending the month of May in the northern woods of Michigan.

The seventh semi-annual meeting of the Northwestern Oph-Lar-Rhin-Otic Society will be held in Omaha on June 8 and 9.

Dr. H. H. Roth of Murphysboro, Ill., is taking post-graduate work in Chicago during the summer months.

Dr. J. A. Donovan of Butte has enlarged his property by the purchase of a large cattle ranch in Montana.

Dr. Eugene R. Lewis of Dubuque, Iowa, is vice-president of the Independent School District of Dubuque.

Dr. Philip L. Coulter is the victim of trachoma acquired while working in the campaign against trachoma in West Virginia.

At the recent meeting of the American Ophthalmological Society in Washington the following officers were elected: Dr. Peter Callan of New York, president; Dr. William H. Wilder of Chicago, vice-president; Dr. William M. Sweet of Philadelphia, secretary-treasurer (re-elected). Dr. Walter R. Parker of Detroit was elected chairman of the thesis committee.

The Wills Eye Hospital, Philadelphia, has received a contingent bequest by the will of Eloise King.

A conference of teachers of the blind was held in Philadelphia on May 11 and 12, under the auspices of the Pennsylvania Institution for the Instruction of the Blind.

Dr. Mary K. Heard has resigned from the Eye Department of the State University of Iowa to give her entire time to private practice in Iowa City.

The following deaths of ophthalmologists are announced:
Dr. Harry B. Casselberry of Hazelton, Pa., aged 49.
Dr. Hobart S. Dye of Washington, D. C., aged 68.

Dr. Willis O. Nance, who was recently re-elected alderman of the sixth ward of Chicago by a large plurality, has been made chairman of the health committee of the board of aldermen for the fourth consecutive term.

Dr. and Mrs. A. S. Rochester have returned from California, and Dr. Rochester has renewed his connection with Dr. Casey Wood and is adjunct ophthalmologist to St. Luke's Hospital.

The following are the newly elected officers of the Eye, Ear, Nose and Throat Section of the Illinois Medical Society: Chairman, Dr. Richard Tivnen of Chicago; secretary-treasurer, Dr. J. Sheldon Clarke of Freeport.

By the death of Bryan Lathrop of Chicago the cause of the blind in Illinois loses a staunch supporter. It was largely due to his efforts and support that the Illinois Association for the Prevention of Blindness was organized.

At the recent annual meeting of the Tennessee State Medical Association, under the presidency of Dr. E. C. Ellett of Memphis, the Eye, Ear, Nose and Throat Section elected the following officers: Chairman, Dr. Charles Huff Davis of Knoxville; vice-chairman, Dr. Alexander B. Dancy of Jackson; secretary, Dr. Edwin Lee Roberts of Nashville.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Patillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.) A. G. Wipperf (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Poli.) Richard S. Patillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wipperf (E.E.N.T.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.) A. G. Wipperf (E.E.N.T.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wipperf (E.E.N.T.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A.M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orent (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orent (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.) W. A. Fisher (E.E.N.T.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orent (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.) W. A. Fisher (E.E.N.T.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.) Oliver Tydings (E. E. N. T.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. B. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

ABBREVIATIONS:

*Special operative eye clinic.

C. C. S.: Chicago Clinical School,
1844 W. Harrison Street.
E. M. D.: Emanuel Mandel Dis-
pensary, 1012 Maxwell St.

County: Cook County Hospital, W.
Harrison and Honore Streets.
Inf.: Illinois Charitable Eye and Ear
Infirmary, Peoria and Adams Streets.
M. H.: Mercy Hospital.

Pol.: Chicago Polyclinic and Hospi-
tal, 221 W. Chicago Avenue.
P.-G.: Post-Graduate Medical School
of Chicago, 2400 Dearborn Street.
N. W. U.: Northwestern University,
2431 Dearborn Street.

Rush: Rush Medical College, W.
Harrison and Wood Streets.
St. Luke's: St. Luke's Hospital, 1416
Indiana Avenue.
U. of I.: College of Medicine, Uni-
versity of Illinois, Congress and Lin-
coln Streets.

THE OPHTHALMIC RECORD

A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

Vol. XXV

CHICAGO, JULY, 1916

No. 7, New Series

A MODE OF EXTRACTING THE LENS IN ITS CAPSULE.

BY

ERNEST E. MADDUX, F. R. C. S., Eng.

BOURNEMOUTH, ENGLAND.

Illustrated

I should like to submit to consideration a method I have been using for some time of extracting the lens in its capsule by a new form of lens loop. So long ago as 1888 Mr. Higgins, of Guy's Hospital, contributed a paper to the *Lancet* on the removal of the lens in its capsule by means of an ordinary *straight* Taylor's vectis, through a *downward* incision of the cornea.

It was one of the brave attempts at the ideal after which so many have striven, but since (to quote his honest words) "In five out of six cases vitreous was lost," the method fell into disuse. Now, however, that Col. Henry Smith's admirable contributions have given a fresh stimulus to the radical extraction of the lens, it is natural to cast about for the best means of dealing with cases which are not suitable for his method. Many patients are too young for his method, others too old, or at least with lenses too hard and large for the size of the cornea, or with eyes too myopic or prominent to be quite pleasant for the Jullundur operation. As one more addition to the valuable alternatives suggested by others I have endeavoured to contrive a lens loop whose use shall be compatible with an *upward* incision of the cornea, and at the same time, be capable of very delicate manipulation. At first I merely bent a Taylor's vectis to a right angle with its stem, as shown in Fig. 1, and swathed its handle with thick rubber tubing to allow smooth rotation about its own longitudinal axis and to afford that sure and delicate grip which is peculiar to rubber. This improvised instrument answered well, and I extracted several lenses in their capsules with it, all of which resulted well, though two were slow in healing owing to the large corneal incision. However, I found in my later cases that the loop is compatible with a

Desmarres' bridge, and the avoidance of an infra-corneal incision in this way greatly favors rapid healing. The chief object of a loop set at right angles to its stem (instead of straight on its end, as in all previous lens loops I can find figured), is to avert the necessity of making the patient look strongly downwards for its insertion, since to do so, as Col. Smith has shown, favors escape of vitreous when there remains nothing to restrain it but the hyaloid. The shape of loop I should now recommend is shown in Fig. 2. The handle is of aluminum, preferably covered with rubber. The length of the loop is greater than that of the vectis, and the shape somewhat obovate, but with a slightly pointed end to break through the suspensory ligament above. Its greatest breadth should be one-third of its length from the point. The wire is smoothly



Fig 1.



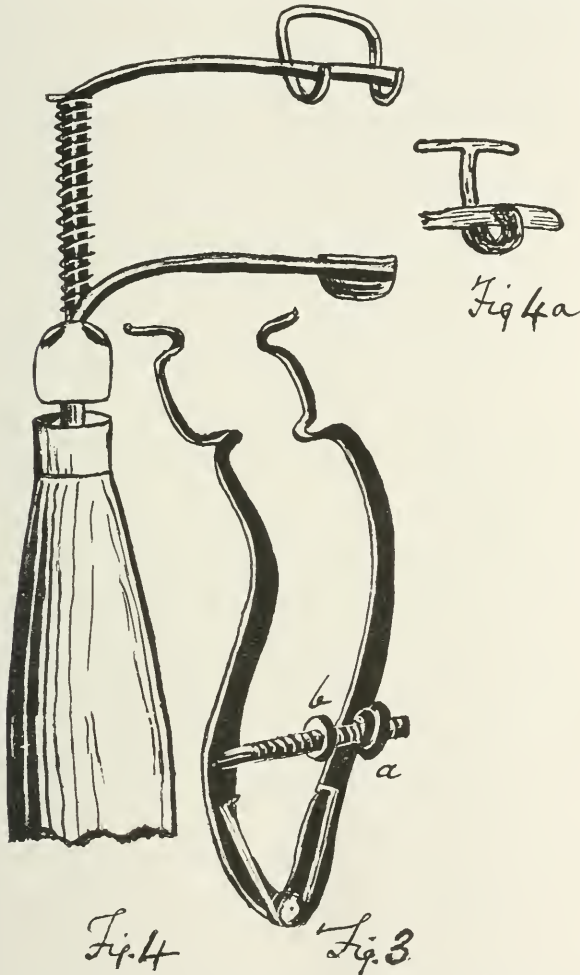
Fig 2.

The Maddox Vectis for the Extraction of Cataract in Its Unruptured Capsule.

rounded everywhere except that it retains a squared edge for two or three millimetres at the posterior margin of the surface which touches the crystalline at the extremity of the loop. This edge, which does not come into contact with the hyaloid, engages with the capsule of the lens as soon as the loop begins to be withdrawn, and should be smooth enough not to scratch the capsule, though gaining a good grip of it.

The instrument has to be supplied in pairs, one for the right and one for the left eye. To get over the top of the lens by perforating the suspensory ligament above is the most difficult part of the manipulation, and in some cases I have perforated the ligament in this situation first with a zonulotome. A skilled assistant is highly desirable, furnished with a Fisher's hook or a strabismus hook, the end of which I like to have prolonged a few millimetres temporalwards at right angles to its shank.

In the absence of an assistant, I have used the "Feather-weight" *aluminium* speculum, as in Fig. 3, made at my suggestion by Messrs. Weiss & Son about two years ago, and with which many have expressed satisfaction for ordinary extraction since. It should be provided with a spring strong enough



Specula for Extraction of Cataract in Its Capsule. (Maddox.)

to overcome the contraction of the orbicularis, and with two nuts on the threaded crossbar, one of which (a) is adjustable to prevent painful stretching of the lids, while for ordinary use the other one (b) is thrown out of the field of action by being run up to near the pivot of the crossbar, to allow the speculum

to be instantaneously closed by the operator. Should it be desirable, on the other hand, entirely to immobilize the speculum, this nut (b) can be run up to the other end of the cross-bar. With an unusually strong orbicularis it may be desirable to do this for the corneal incision.

When a trained and sufficiently skilled assistant is available, a lid hook or elevator is superior to any form of speculum, but with indifferent assistance either a Summer's speculum can be used, or else a speculum fitted with a large grip handle such as I showed at the Aberdeen meeting of the British Medical Association in July, 1914, and which is shown in Fig. 4, though with undue massiveness. A similar instrument has also since been devised by the Drs. Green of San Francisco. That bar of my grip speculum which controls the lower lid, rotates freely on the cylindrical and smoothly rounded stem, and is not touched by the assistant after its insertion till the time comes for its withdrawal. This leaves the grip handle in rigid continuity with the upper lid-loop only, so that the upper lid can be drawn forward when desired, without thinking of the lower lid, which the lower bar clings to automatically by reason of its antero-posterior freedom, though the spring presses it downwards all the time.

A more varied experience will no doubt enable the shape of the upper lid wire to be improved upon, or a T-piece, suggested by Derrick Vail's lid hook, may be employed, as also shown in the figure (4a). This should be bendable to any desired shape. The best of specula however is not equal to a hook. Another expedient of distinct advantage in loop extraction is the "Superior Rectus thread" of which an account may be found in the Transactions of the Ophthalm. Society of the U. K. p. 284, 1914. In drawing out the whole lens by a lens loop it is important to have some control of the eye to keep the cornea from being drawn upwards by the loop. Yet countertraction by fixation forceps below the cornea favors vitreous escape, and Angelucci's fixation does not sufficiently relieve the globe from the pressure of the upper lid to be recommended for intracapsular extraction. The traction thread which I described does not interfere with the use of any appliance for raising the upper lid from the globe, whether speculum or hook, and allows the globe to be drawn partly down at the critical moment, simply by antagonizing the superior rectus and thus relieving the eyeball from muscular pressure. It is passed

through the episcleral tissue over the insertion of the superior rectus, as the first step of the operation, and is then so laid over the temple as to remain undisturbed if the speculum is whipped out. Quite a fine black thread suffices. I prefer to have it saturated with a harmless antiseptic, such as carbolic acid 1 to 40. When taking the lens loop in the right hand, the black thread should be taken in the left, ready to steady the eye if necessary during withdrawal of the lens, against the inevitable resistance which the suspensory ligament offers to the force which ruptures it. The direction of traction should correspond pretty closely with the line of the superior rectus tendon. After the escape of the lens the thread again comes into use for the reposition of the iris, taking care to use it gently, so as to draw the eyeball downwards no more than is just needed. The eyelids are now closed in the usual way, and one part of the thread divided with scissors close to the lid margins, so that by traction on the other part it comes away quite easily with the eye still closed.

The string is not necessary however if a Desmarres' bridge is employed, since the latter can be drawn upon by smooth forceps so as to act in the same way. A modified Desmarres' bridge is my favorite practice, since it ensures such rapid healing. It is cut so as to spring, not from the center of the corneal flap, but a little to one, preferably the nasal, side, as described at the Aberdeen meeting of the British Medical Association, July, 1914.*

When a "bridge" is impracticable, what might be called a "whisker incision" is next best. In this, both the puncture and counter-puncture are made through a little conjunctiva on each side of the cornea, though the knife is made to emerge through the limbus at the apex perpendicularly to the surface of the cornea. This allows the loop to be inserted easily, though the extremities of the incision are covered with conjunctiva of so short a breadth as rarely to infold.

The second meeting of the Colorado Ophthalmological Congress will be held in Denver August 1st and 2nd, 1916. The program of the Congress can be obtained after June 20th, by application to the Secretary, Dr. William H. Crisp, Metropolitan Building, Denver, Colorado.

**Ophthalmic Review*, Vol. XXXIII, p. 361.

CONGENITAL COLOBOMA OF LENS.*

BY

WALTER BAER WEIDLER, M. D.

NEW YORK CITY.

In more than fifty per cent of the cases of coloboma of the lens there is associated with this condition a coloboma of the iris, ciliary body, chorioid or optic nerve.

Coloboma of the lens is comparatively rare and is usually seen on the lower border, but in my case the coloboma was directly inwards. The absence of any coloboma of the chorioid or the iris and the presence of the micro-cornea makes this case more unique in its rarity.

It is a defect that could readily escape attention in a casual ophthalmoscopic examination of the eye, and may explain why so few have been reported. Coloboma of the chorioid is relatively a common defect and was first observed in 1831, whereas coloboma of the lens was not reported until 1862 by Knapp.

Report of case:

Miss H. F., aet. 10, born of Hebrew parents, at term, one year and a half after the previous child. No history of miscarriages or any forms of congenital defects in the immediate family. Child always held her books close to her eyes and the school nurse requested an examination of her eyes for glasses on account of the poor vision in the left eye.

The patient was first seen by me at the Manhattan Eye & Ear Hospital and an examination revealed the following: Pupils 3.5 millimeters, irides brown, react to light, accommodation and convergence, and the tension is normal.

O. D. vision 20/20.

O. S. vision 20/70.

The corneal measurements of the right eye were 11 by 12 millimeters, whereas in the left eye they were 10 by 9 millimeters, placed at an axis of 60 degrees.

Oblique illumination: The iris stroma does not show the same degree of development as in the right eye. There is almost complete absence of the pits and ridges on the nasal side of the iris. The pupillary edge is very slightly notched with a slight thinning of the retinal pigment layer. The iris stroma is also thinner.

Ophthalmoscopic examination: O. D. media clear, disc is oval, 7 by 8 millimeters, long axis 105°, scleral ring all around, eccentric excavation out, vessels long axis 120 degrees.

O. S. media clear, disc is oval, 7 by 8 millimeters, long axis 120 degrees, scleral ring all around, broad chorioidal ring up, in and down. There is a fairly large sized chorioidal pigment crescent down and in, and this pigment extends from the margin of the disc into the fundus for a distance of five millimeters.

There is absolutely no defect of the chorioid seen that could be considered as colobomatous in nature. The retinal and chorioidal coats are normal from the edge of the disc to as far forward as can be seen. The margin of the inner half of the disc is rather difficult to see on account of the parallaxic motions, but with an electric ophthalmoscope one is able to make out the different levels very much better than with the old style ophthalmoscope. The parallaxic movement of the vessels is due to looking through the different thicknesses of the crystalline lens at the edge of the notch.



Coloboma Lens—Nasal Side O. S. (Weidler).

To the nasal side of the lens about 5 millimeters from the center a series of dark concave shadows is seen and these increase in density as you approach the inner edge of the lens. There is a complete notching of the nasal side of the lens at the horizontal axis which appears to be about three or four millimeters deep. In the clear space the thin fine fibrillae of the suspensory ligament are seen and these are best seen with a +16 spherical. They may also be seen with oblique illumination. The edge of the lens is smooth and regular and the rest of the lens is perfectly normal.

Refraction, atropin:

O. D. —1 sp. +0.75 cyl. axis 180° 20/15.

O. S. —2.50 sp. +2 cyl. axis 180° 20/60.

The majority of the cases reported had a fairly high degree of myopia present. Knapp's case showed a high degree of astigmatism, and in my own case there was myopia with

hypermetropic astigmatism, and the vision improved very slightly with glasses.

The vision is greatly reduced in all the cases that have been reported, and is not much improved with correcting lenses. Heredity does not seem to play a very active part in the formation of coloboma of the lens and the defect is usually unilateral, having no special predilection for sex.

Heyl thinks that due to the symmetry of the existing portion of the lens, it is evident that the coloboma cannot arise from a cause acting during the earliest stage of development. The condition of the suspensory ligament is most important, but the records do not afford very dependable evidence. It is only with the greatest care that the normal filaments can be seen. In the cases that have been reported there has been a wide difference in the findings, i. e. from the complete absence of the Zonule of Zinn to the full development.

Hess believes that the formation of a coloboma in the lens is due to an abnormally long persistence of some of the vessels of the lens sheath. Heyl takes just the opposite view and says that the coloboma is due to the fact that parts of the lens were insufficiently nourished and, therefore, developed defectively owing to deficient blood supply to the vascular sheath.

The explanation advanced by Hess seems more likely, as the vascular sheath persists until late in the foetal life, and therefore deep indentations may be produced by vascular bands.

Gunn (*Trans. Ophth. Soc. XXIV*, page 84—1914) reports one case with double coloboma up and in with maldevelopment of the suspensory ligament.

Morton (*Trans. Ophth. Soc. XXI*, page 179—1901) reports a case with double coloboma, one down and out and a smaller one up. No trace of the Zonule of Zinn is seen in the region of the colobomata. These two cases agree with Kampfer's idea that colobomata are due to defective development of the fibres of Zonule of Zinn.

It is evident, however, that we do not know just which one of these explanations of this congenital defect in the lens is correct.

*Read before the Ophthalmological Section of the Academy of Medicine, New York City, January 20, 1913.

A RARE TUBERCULAR CONDITION OF THE EYE.

BY

HAL. R. WRIGHT, D. D. S., M. D.,
COLUMBUS, OHIO.

After a careful but not very extensive search through the available literature, I fail to find a like case reported.

Case number, 0-42.

Mrs. V., age 40, well nourished, blond.

Patient appeared in perfect health, but complained of left eye. Was photophobic and had some conjunctivitis. Past history negative. Present trouble began three years ago (July of 1910). Eye became slightly painful, could not stand the light and there was excessive lacrymation. A slightly red and elevated spot appeared at sclero-corneal border of the left eye at a point representing 5:30 o'clock. During this time was treated



1.

by four or five ophthalmologists; suffered much pain all this time and eye apparently getting worse.

June 11, 1913, patient presented herself at my office.

Left eye, cornea clear, pupil widely dilated, conjunctiva appeared normal, excepting about a staphyloma that was located at the sclero-corneal border at a point represented by 5 o'clock. This staphyloma was 3mm. at the base, 2½mm. high, cone shaped. It was thin walled and easily compressed. A large blood vessel passed to the apex from the conjunctival side. Pressure on it caused no pain. The staphyloma was opened, the clear aqueous rushed forth, draining the anterior chamber. A compress bandage was applied, being renewed every two or three days. Conjunctiva united readily and appeared quite flat.

July 23, 1913, patient again appeared. Staphyloma some larger. Base 4mm. broad, 3mm. high. On this day the entire

staphyloma was dissected out and edges cauterized. Healing took place rapidly under pressure bandage. Area appeared flat.

Oct. 21, 1913, patient again appeared. Staphyloma recurred, same size as before. Nov. 3, 1913, entire staphyloma was dissected off, pressure bandage applied and patient in-



II.



IV.

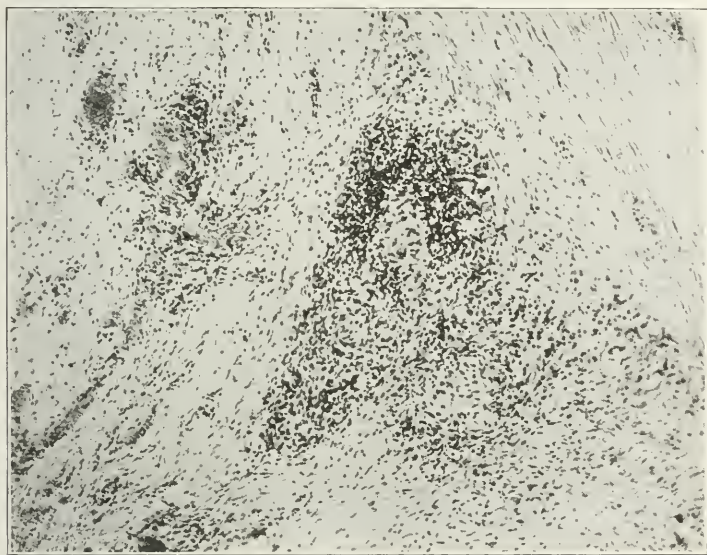
III.

structed to report every other day. On Nov. 5, 1913, a corneal paracentesis was performed, this operation was repeated on the 7th-9th-11th-13th-17th-19th-21st and 23rd of Nov., a compress bandage being applied each time. On the 28th the eye was examined again; area was flat and appeared quite strong. On the 30th bandage was removed and patient dismissed.

April 27, 1914, patient appeared for refraction of right eye. Vision left eye 15/60; no attempt made to refract this eye. Spot at sight of staphyloma quite flat and hardly visible.

Oct. 3, 1914, was called to patient's home. Staphyloma had again appeared and was larger and very dark in color. Patient stated that it began growing early in September, but it enlarged very slowly until Oct. 1, 1914, when it suddenly increased to three times its original size.

The mass was 8mm. long, 6mm. broad, 3½mm. high, and was dark in color. Pressure had no effect on it. It looked much like a melanotic sarcoma and a tentative diagnosis to this



v.

effect was made. Consultation was asked for and enucleation was advised after much delay, for patient had been suffering for three months with sciatica.

Oct. 13, 1914, patient removed to hospital and the next day the eye was enucleated by the snare and right sciatic nerve stretched. Patient made a rapid recovery and has since been in perfect health.

Pathological findings.

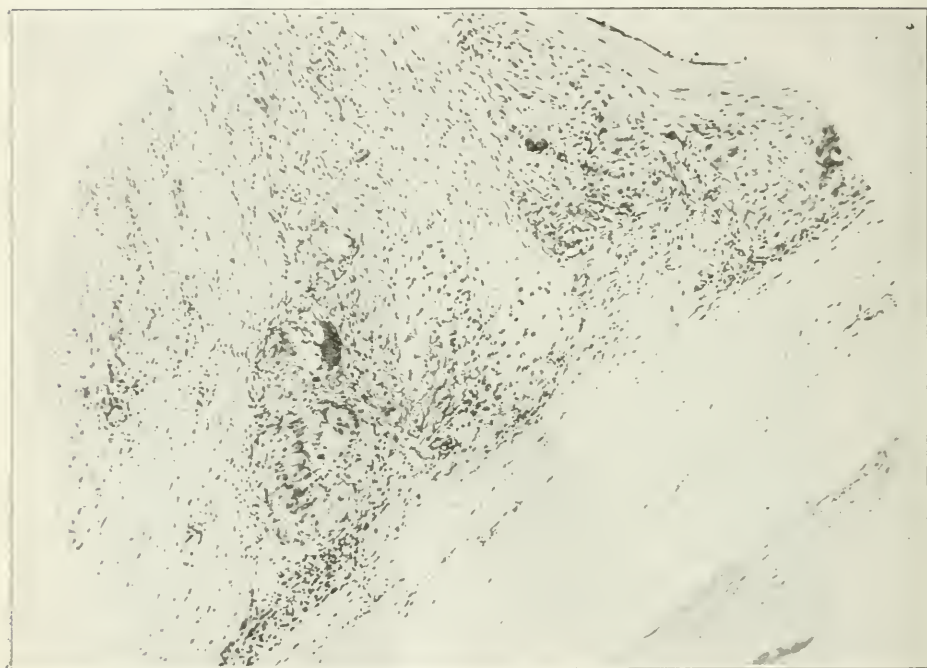
Photomicrograph No. 2 shows that it is a true staphyloma, and not a neoplasm, located at the sclero-corneal border. Detachment of the retina occurred after enucleation.

The external surface is covered with stratified squamous

epithelium, as found on conjunctiva and cornea. Its internal surface is covered by the iris which is firmly adhered (which explains the change in color of the tumor). The posterior base of the staphyloma is very thick and gradually becomes thin as it passes forward and becomes continuous with the cornea.

The layer between the internal pigmented and the external epithelial coats is of connective tissue, adult type, and shows many areas of infiltration.

The posterior arm is a very interesting portion, as photo-

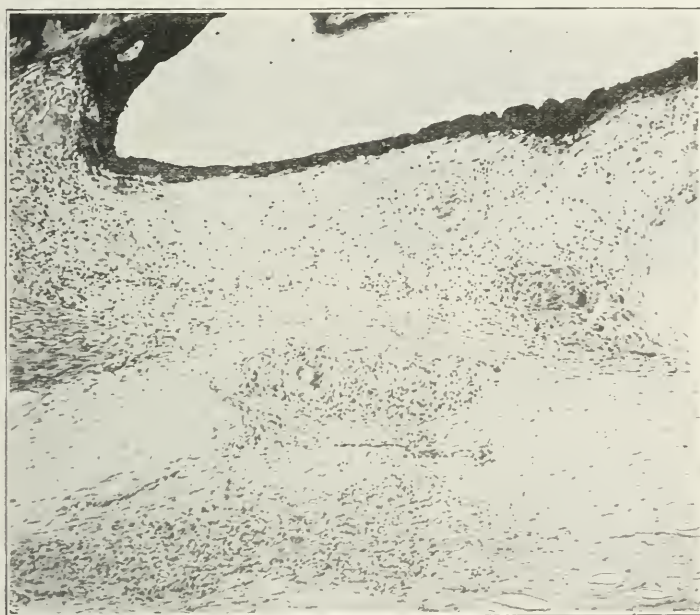


VI.

micrograph No. 4 will show. Here the iris and first ciliary process is seen to bend abruptly forward and out. The outer surface of the iris is in close contact with the rounded end of the sclerotic and from here on is closely bound to the internal surface of the tissues forming the staphyloma. A cystic condition of the iris is noted, as the internal pigmented layer is separated, probably due to a serous exudate.

The posterior arm of the staphyloma is the thickest and most interesting part; the location is where the cornea blends into the sclera.

Just external to the base of the iris we find the rounded end of the internal half of the sclera intact and showing no marked changes. At the external half of the sclera we find the fibers separated and showing many infiltrated areas, all of which have more or less tendency to coalesce. One of these areas is composed of small round cells (lymphocytes). The others are composed of endothelial leucocytes (epithelioid cells) with a varying number of small round cells scattered among them. In some of these areas giant cells are found, the cytoplasm of some of these showing some evidence of degeneration.



VII.

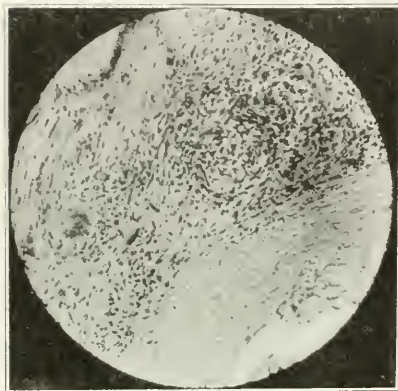
Many vessels are found in this region; all show more or less infiltration of small round cells about them.

The areas composed of endothelial leucocytes and small round cells, some of which contain giant cells, resemble the description of the typical tubercle given by Adami.

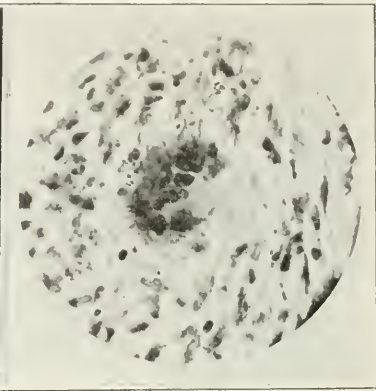
Unfortunately the tissue was fixed in formalin, this making it useless to stain for tubercle bacilli. Sections were stained according to the method of Levaditi to determine whether the *spirochaeta pallida* was the causative factor, with negative results. The Wassermann was negative in this case on two occasions.

In photomicrograph No. 7 taken from the sclero-corneal border of the opposite side are seen infiltrated areas at the base of the iris, ciliary body and two large areas in the sclera. All resemble those areas found in the posterior arm of the staphyloma.

In photomicrograph No. 8 taken from the base of the



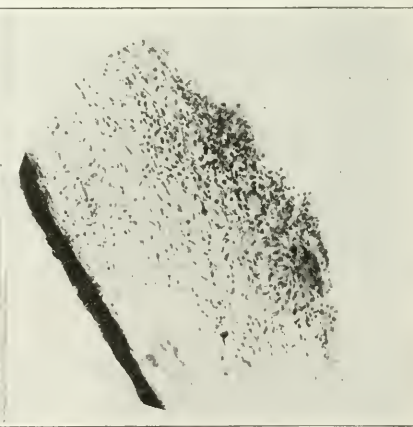
VIII.



IX.



X.



XI.

iris of this side is seen an early tubercle, showing a giant cell with a few endothelial leucocytes and lymphocytes about it.

Photomicrograph No. 9 is a higher power of one of the infiltrated areas showing a giant cell with some degeneration of its cytoplasm surrounded by endothelial leucocytes and a few lymphocytes.

Photomicrograph No. 10 shows an early tubercle located on the anterior surface of the iris 1mm. out from the ligamentum pectinatum, a giant cell whose cytoplasm shows some degenerative changes, surrounded on the iris side by endothelial leucocytes and a few lymphocytes. Farther out in the iris near the pupillary border, several tubercles are found, some of which are located deeper in the iris tissues.

Photomicrograph No. 11 shows the characteristic endothelial leucocytes with a few lymphocytes, causing a small elevation of the anterior surface of the iris.

For the beautiful photomicrographs, I am indebted to Dr. Carl Hügger of this city.

PALPEBRAL SYPHILIS.

BY

J. ROSENBAUM, M. D.

CLIN. ASST. IN OPHTHALMOLOGY ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA.

Palpebral syphilis in any one of the three stages is relatively a rare event. A case that came under my observation has some interesting features, and I thought it might be of interest to the society.

F. B., æt 32—Driver—French Canadian.—Came to me December, 1915, complaining of "ulceration of the eye-lids," duration, 14 months, and "watering of the eye."

History.

About 14 months ago a small, hard pimple appeared on the margin of the R. upper lid, among the eye-lashes, which soon broke open and became covered with a brownish scab. About 2 months later, two or three similar pimples appeared on the inner half of the lower lid and upper part of the face, and these also broke and became covered with a scab. The scab would occasionally fall off and leave an open sore, which gradually increased in size.

His doctor treated the condition as a common sore, but without any benefit.

Gonorrhea 15 years ago, but denies syphilis: has never had a rash, sore throat or sore on genitals. Moderate drinker and smoker. Married twelve years, but has no children; wife had a miscarriage (4 mos.) 8 years ago.

The most striking feature of the case, as will be seen in the photograph, was the punched-out ulcers occupying the ciliary margins of the lids and upper part of the face, and the

absence of the eye-lashes. The edges of the ulcers were undermined, irregular in outline, and the floor covered with a yellow crust. The oedema and infiltration of the upper lid caused it to hang at a slightly lower level than the left; the movements of the lid were normal.

The left eye was normal. General systemic examination was negative.

The Wassermann test reported by Dr. Bruere was pos. + + +.

In order to observe the effect of treatment of the case, the patient was recommended for admission to the eye ward, where one dose of .6 gm. of Salvarsan was given intravenously, and followed with mercuric inunction and pot. iodide. Ung. Hydrarg. 5i q.d.



Punched-Out Ulcers of Palpebral Syphilis.

There was no appreciable change in the condition until the fourth day, when the crust of the ulcers fell off, and left a floor occupied by healthy granulation tissue.

On the tenth day the patient was discharged cured, the ulcers having cicatrized.

Owing to cicatrization of the ulcer of the face, there was some ectropion of the lower lid, with eversion of the canaliculus.

Altner, of Toledo, quoting Bulkley's article entitled "Syphilis in the Innocent," states that 25% of all cases of lues are extra-genital, and of this about 4% are on the lids. He places them fifth in order of location. For extra-genital pri-

mary infection Muncheimer places them in the seventh place (among extra-genital), after the lips, mouth, finger, hands and tonsils. Willbrauf and Stailin, in 16,615 cases of syphilis, in 307 of which the primary sore was extra-genital, do not mention a single case of chancre of the lid. Talbot was more fortunate, having found 3 cases of chancre of the eye-lid in 403 cases of lues. Ziessel found 8 cases of lid trouble, in 40,000 cases of syphilis.

At our own hospital, we had only one case of chancre of the inner canthus out of 21,000 general ocular cases.

The primary lesion seldom develops on the outer skin, but is most frequently intermarginal, or on the canthus, or upon the conjunctiva tarsi; the delicate texture of the canthus, where the dermis changes to mucosa, and where the glands of the conjunctiva and meibomian glands discharge their contents, offers an easier media for inoculation.

The pre-auricular and other glands are often so swollen that a diagnosis of mumps might easily be made.

According to Pointoux, chancre of the outer third is characterized by an enlargement of the pre-auricular gland, while chancre of the inner third causes sub-maxillary enlargement.

In the secondary stage, fissures of the external canthi have been observed; the skin of the eye-lids enters into the skin eruptions of the second stage very little, or not at all.

The most common form of palpebral tertiary involvement is tarsitis; the tarsus becomes markedly enlarged, and the swelling of the tarsus is sometimes so great that the lid can no longer be everted. The cilia upon the affected lid fall out. Later on the swelling subsides very slowly until the tarsus reaches the former volume, or in consequence of atrophy, falls somewhat below it.

The sources of infection are various—through kissing, removing f. b. with the tongue, or from the use of the common towel, etc., etc.

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A METHOD OF OPERATION IN EXTENSIVE SYMBLEPHARON.

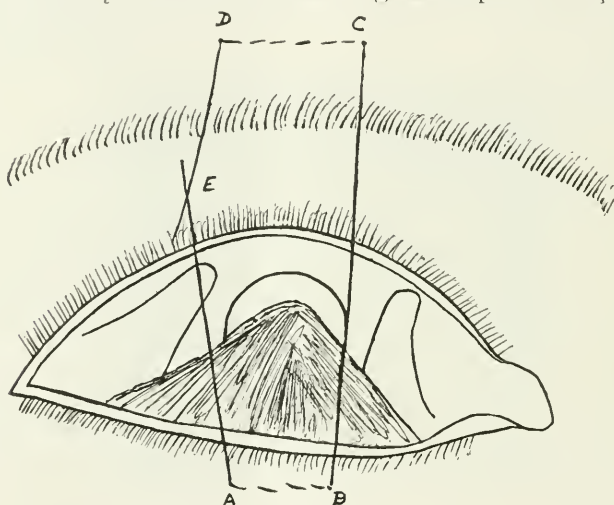
BY

FREDERICK KRAUSS, M. D.

PHILADELPHIA.

The difficulty of invariably obtaining a good result in symblepharon invites us to bring forward any improvement in technique which makes the operation easier and more positive. In the following description, the bulbar defect is covered in part by conjunctival flaps and the palpebral portion by a skin flap.

It is particularly in regard to the latter that we write. Much difficulty is found in retaining the flaps in the position



Conjunctival Flaps and Stay-Suture.

desired. Suturing is unsatisfactory, lead plates are equally so. I have found the use of the elevator pulley suture, to be described, very satisfactory in that it holds the lower lid on the stretch, permitting a larger flap to be used on the inner surface of the lid with good apposition against the globe and lastly a deep sulcus, from which the flap does not tend to work out.

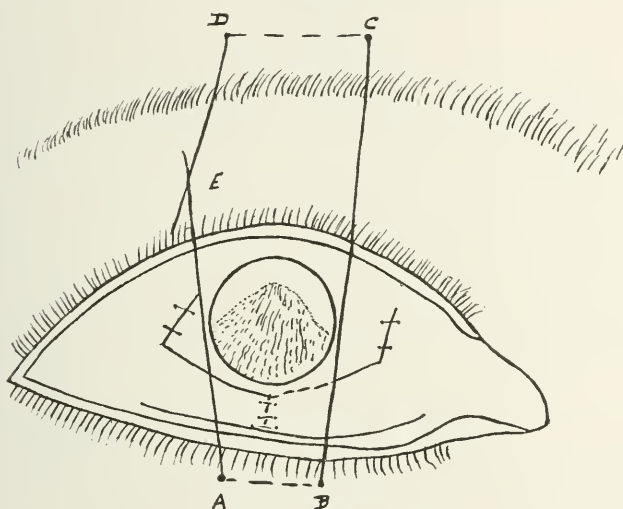
Laborer,—25 years old, was severely burned in his right eye, neck and chest by molten steel five months ago. When seen one month ago, he presented an extensive symblepharon completely blocking the lower culdesac, excepting a small area on each side. The cornea through two-thirds of its extent was covered by a thick fleshy mass continuous with the lower lid.

There were several smaller synechiae in the upper culdesac. The cornea was hazed throughout its extent, allowing light perception only. The eye was uncomfortable as well as unsightly.

The operation was performed under ether at the Protestant Episcopal Hospital. I will not burden you with the well known technique of asepsis. It consisted of the following steps.

The thick pterygium-like mass was carefully dissected from the cornea and from the eyeball to the depth of the normal culdesac. In the course of this dissection, small isolated areas of conjunctiva were discovered and saved.

A large flap of conjunctiva was loosened on the inner and



Flaps Stitched in Position.

outer sides of the eyeball. These were necessarily rather short, but were united to cover the eyeball by means of sutures. The bottom of the culdesac and the palpebral wall were covered with a Wolff graft, taken from behind the ear.

The flap was readily retained in position by a skin suture inserted near the center of the upper part of the lower lid, brought out about $\frac{5}{8}$ inch away, carried up to the forehead where it was similarly introduced, tying the ends over a piece of gauze. The suture acts as a pulley, allowing as much elevation of the lower lid as may be desired. The graft is pressed between the eyeball and the lower lid and held securely, by the large piece of gauze covering the eyeball over which the above named suture is tied. The suture was removed in five days,

leaving no trace. The healing has been excellent and a good cosmetic result obtained.

In the rough drawings exhibited, the needle is introduced at A—brought out at B—carried to C—introduced and brought out at D. When tying the suture at E, the lid can be elevated to the position desired, and at the same time, the large piece of gauze over which it is tied holds the eyeball quiet, allowing time for healing.

THE BIOLOGICAL THEORY OF SYMPATHETIC OPHTHALMIA.

BY

H. GIFFORD.

OMAHA, NEBR.

Although to preserve a fictitious appearance of modesty I should prefer to have some one else do it, I feel called upon to point out that the theory of "sympathetic uveitis" advanced by O'Connor in the April number of the RECORD was proposed by me in 1899, 1902 and 1913; but as my suggestion caused no great excitement, never, in fact, having been noticed by anyone, so far as I have observed, it is not surprising that he should have overlooked it.

Dr. O'Connor says: "The whole theory might be stated as follows:

1. The organisms growing in the exciting eye after a variable period develop their specific affinity for uveal tissue.
2. After another variable period they gain access to the blood stream, and are carried to all parts of the body.
3. The uveal tract being the vascular tract of the eye is extremely likely to have organisms deposited or, as Dr. Rose now says, "It appears that the cells of the tissue for which a given strain shows elective affinity take the bacteria out of the circulation as if by a magnet—absorption."
4. Such deposits having occurred the organisms are immediately, through their affinity, able to start the characteristic inflammation, even though there be no primary reduction in the vitality of the tissues."

In a paper read at Columbus, O., in 1899, (printed in Journ. Amer. Med. Soc., Febr. 10, 1900) I wrote as follows: "Finally, with regard to the theory of Schmidt-Rimpler, which combines the germ and ciliary nerve theories, and assumes that on account of the vasomotor disturbance occasioned in the

well eye by the irritation in the injured one, germs which may have entered the circulation from any part of the body find a suitable environment for their development in the well eye; I must say that this is opposed to a vast amount of important clinical testimony. If sympathetic ophthalmia depended merely on the coincidence of ciliary irritation and the accidental presence of germs in the circulation, why should we never hear of sympathetic ophthalmia in the tedious ciliary irritation existing with the numerous cases of one-sided keratitis, whether of trachomatous, herpes, phlyctenular or other origin? *This seems to me a fatal objection to the theory, unless we add still another theoretic assumption, namely that if the germs reach the second eye through the circulation, they must come from the injured eye; either because from the start they were especially adapted for growth in the eye, or because through a process of natural selection in the course of their growth in the first eye, the survivors have become especially fitted to attack eye tissues in general.* I do not pretend that I have any great confidence in the theory as thus elaborated, but it seems to me that without such an addition the theory of Schmidt-Rimpler will not stand the test of clinical experience."

Again in 1902, in discussing various points connected with sympathetic ophthalmia (Arch. of Ophthalmology, XXX, p. 549), I said: "In the case of sympathetic ophthalmia, however, it is not necessary to assume the existence of a germ specially adapted by nature for growth in the tissues of the eye before its entrance into the latter. The rarity of the disease, and the fact that it practically never has a chance to be propagated from case to case, both speak against such an assumption; but it may be that various species of microbes, after growing within the eye for several days or weeks, may, by a process of natural selection, acquire a certain specific adaptation to the uveal tract, so that, on being carried to the second eye by the blood current, they find there conditions most favorable to their development."

Finally, in an address in Chicago in 1913 (OPHTHALMIC RECORD, February, 1914), I went over the same ground.

The twenty-first annual meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held in Memphis on December, 11, 12 and 13, 1916, instead of the preceding week as formerly announced.

THE NON-OPERATIVE TREATMENT OF INCIPIENT CATARACT.

BY

ELMER JEFFERSON BISSELL, M. D., F. A. C. S.,

ROCHESTER, N. Y.

Cataract, any degree of opacity of the crystalline lens, is the most common abnormality found within the eye and its surgical treatment has received more attention than any other ophthalmic operation. Only a very small percentage of cataracts ever sufficiently develop to require operative measures and yet non-surgical therapy has been given but scant consideration and its efficacy has been doubted by many. Should this therapeutic nihilism be deemed a reproach or a commendable with-holding of useless effort? I consider this one of the important questions in ophthalmology.

In scientific medicine to-day therapy waits upon a thorough investigation of the cause of a disease. Do we know enough regarding the etiology and pathogenesis of cataract to attempt to suggest a line of non-surgical treatment for patients with lens opacity beginning to appear in the middle and later years of life? I believe we do and that at least some of our patients would be greatly benefited if we considered incipient cataract as a challenge to our non-surgical skill. When other intraocular structural changes are discovered a diligent search for the cause is usually instituted and it may be found quite remote from the eye and result in indicating very effective therapeutic measures. Why should not an equally diligent search be made when opacity of the lens is present? It may never progress, but why has it commenced and can anyone from its appearance determine that it will not advance? Are there no facts to warrant an investigation? Are the requirements of scientific medicine satisfied with simply a diagnosis of lens opacity and an opinion that nothing can be done until an operation is indicated? Is the case closed to all effort, because perchance the dogma still exists that it is a senile disease? Dr. Beard¹ says, "Loss of transparency in the crystalline lens is not the inevitable result of senility," and Dr. Dor is quoted as saying, "There are cataracts among the aged, but there is no such thing as senile cataract." Do physicians do nothing for patients with premature senile changes of the brain, kidneys, heart or blood vessels? On the contrary are not the lives of

patients often made more comfortable and their days lengthened by intelligent effort?

A rapidly increasing number of ophthalmologists are of the opinion that opacity of the lens beginning in adult life is only a symptom of either a local or general disease and that it may be diminished or retarded, in many cases that would otherwise progress, by local and general treatment suited to the causes active in a given case. If we do not search for these causes, we surely shall not find them.

Lt. Col. Henry Smith, than whom there is no one with greater opportunity to observe cataract cases, said at the Oxford Ophthalmological Congress in 1914, "The dream of both patients and ophthalmologists has been to discover some method to disperse cataract or prevent its development. I think we are on the track; I have little doubt of it myself." Dr. Casey A. Wood² has written, "The non-operative treatment of cataract in its early stage is of greater interest than the conduct of cases of complete or mature cataract, inasmuch as the latter is entirely operative. All forms of incipient cataract due to general conditions should be treated in conjunction with the general health. Every source of eye strain should be removed and organic lesions of the eyes should be strictly looked after." These suggestions cannot be carried out without a thorough examination by a general physician coöperating with the oculist. It is sometimes difficult to get this coöperation because specialists have given the impression that "watchful waiting" is all that is necessary.

1. What local conditions are definitely known to cause cataract? Glaucoma, detached retina, retinitis pigmentosa, choroiditis, iridocyclitis, myopia, uveitis and ciliary spasm. In other words any intraocular disturbance of nutrition may act as an exciting cause. Various theories of the *modus operandi* have been suggested, but the limits of this paper will not permit me to discuss them in detail. The following have been given by different investigators: Poor nutriment, inability of lens epithelium to appropriate nutriment, the presence of some unusual chemical substances, dehydration of the lens and the change of its soluble albumin to insoluble.

2. What general conditions, toxic substances, etc., are known to produce cataract? Diabetes, albuminuria, malaria, tetany, thyroidism, skin diseases, arteriosclerosis and auto-intoxication; great heat, electric shocks and exposure to extreme

ultra-violet radiations; ergot, naphthaline, phosphorus, sugar and salt. Surely such an array of possible etiological factors is enough to stimulate the investigating scientific spirit of any physician and is sufficient proof that every case of incipient cataract should have the benefit of such an investigation.

Perhaps we will more clearly comprehend the relationship between these general diseases and lens opacity if we review the action of ergot, naphthaline, sugar and salt. No one disputes the fact that these will produce a complete opacity of the lens which cannot be distinguished from the ordinary cataract which is found associated with some of the diseases just enumerated. Ergot causes constriction of the blood vessels within the eye and a contraction of the ciliary muscle. This produces a lack of nutrition in the interior segment of the eye and cataract develops as one of the most sure symptoms of this drug. Naphthaline exerts a toxic action on the capsular epithelium and allows fluid to enter and spread between the lens fibers. Opacity of the lens then appears, often accompanied by an increase of refraction like the "second sight" of elderly people. Pagenstecher³ caused cataract in three litters of rabbits by giving naphthaline to pregnant rabbits. Sugar and salt introduced in large quantities under the skin or into the intestines cause cataract, probably by dehydration of the lens.

With these facts established it takes no stretch of the imagination to understand why arteriosclerosis, auto-intoxication or perverted internal secretions of the ductless glands might produce lens opacity. In the presence of disturbed metabolism or when the blood and lymphatics become loaded with toxins we do not think it strange that tissue changes take place in any part of the body, including the optic nerve, retina, choroid or uvea and why should any one expect the crystalline lens to escape? We know but little regarding the selective action of toxins and abnormal chemical combinations within the body, but it would not be strange if some had a special affinity for structures like the lens, capsular epithelium or gland-like cells of the ciliary body. If therefore, it seems reasonable to assume that cataract is often dependent upon some disease external to the eye it is the duty of the physician to co-operate with the oculist in discovering the cause and to make every possible effort to correct or modify it.

Clinical experience is the final test of the value of any therapy. Have local and general measures given positive,

beneficial results? The peculiarly uncertain pathogenesis of cataract renders it difficult to always determine what has been accomplished, but nevertheless in quite a large percentage of cases the results are sufficiently definite to enable the oculist to decide as to the efficacy of the means employed.

1. Local therapy. Certainly cataract resulting from detached retina or absolute glaucoma cannot be influenced by any treatment, but every oculist has seen progressive lens opacity associated with choroiditis either diminished or become checked by treatment used for the choroiditis. It is quite probable that in many reports of improved vision in cataract cases from the employment of local applications of dionin, potassium iodide or subconjunctival injections of cyanide of mercury that the improvement has been due partly or wholly to a clearing of the vitreous opacities and a beneficial effect upon the choroid. I have observed a considerable number of such cases after employing the above measures and would have been inclined to ascribe the result to a change in the lens if I had not had very careful drawings of the lens opacity, but I have also seen very positive improvement within the lens in about 15% of the cases treated. In this connection it is well to emphasize the importance of very careful drawings if we are ever to arrive at trustworthy conclusions. Attached to the chair where I make my ophthalmoscopic examinations is a swinging arm bracket carrying a small drawing board which can be quickly brought into a convenient position. Fastened to the board is an upright arm supporting a magnifying glass. Connected to the board is a cord by which I can turn on or off an electric light. By this arrangement it is possible to alternately observe and record the opacity rapidly and accurately.

Lt. Col. Smith⁴ reports "phenomenal" improvement in some cataract cases from subconjunctival injections of 1 to 4000 cyanide of mercury. In diffuse fogginess and dust-like opacities of the lens I have seen very marked improvement from its use, but have not observed any effect upon opaque fibers. I have employed it in thirty-three cases and twelve have shown improvement in the opacity of the lens. The improved vision has been in the proportion of from 20/70 to 20/30. Dr. Dor, of Lyons,⁵ a most careful experimenter and observer, has been prescribing for his cataract cases for over twelve years an eye bath of 2% sodium iodide and 2% calcium chloride for one-half hour daily. He reports 10% improved, 80% arrested.

Many other experienced and reliable oculists report benefit from either the local application or subconjunctival injections of potassium iodide, dionin, fibrolysin or resorcin. Since Pflugk in 1908⁶ recommended subconjunctival injections of potassium iodide I have used it in sixty carefully selected cases, i. e., when the opacity was increasingly reducing the vision. In 6% there was marked diminution of the opacity, in 25% slight improvement and in only 3% has there been any increase. I was led to its employment by Pflugk's experiments upon animals. He found that its local use retarded the action of naphthaline upon the lens epithelium and if it was also given internally the retarding effect was much more pronounced. This suggests the advantage of both local and general treatment. It must be admitted that when we employ both it is impossible to tell which accomplishes the greater good, but it is my opinion that in the majority of cases the general therapy is the more important. For fifteen years I have had my cataract cases try to exercise their accommodation by bringing a 4 mm. black dot on a card from twenty inches away up to ten inches from the eye. This is repeated from eight to twenty times twice a day and during the exercise only the correction of the refraction for distance is worn. I believe that even a slight change in the convexity of the lens during this exercise increases its power to appropriate nutriment. It is important to prescribe correct glasses and to advise using the eyes for short periods of time and under favorable conditions.

2. General therapy. There is no specific remedy for cataract. It is, therefore, necessary to discover what disease is present and prescribe accordingly and to try to correct any faults of diet, digestion, drinking, bathing, thinking and exercise. In every cataract case a quantitative examination of the urine should be made, not only to determine if there is diabetes or any form of nephritis present but also if there is renal insufficiency. In two hundred cataract cases in which I have had a quantitative examination of a twenty-four hour specimen I found the average elimination of solids was 47 grammes and the average blood pressure was 169.4 mm. Hg. This shows nearly a normal elimination from the kidneys, but some had a very low elimination of urea and chlorides and when it was possible to increase these there was usually an improvement in the eyes. In diabetes, whatever will control this disease will have a tendency to retard the cataract and may even clear up

the opacity. Fifty-one different observers have reported one hundred forty-seven diabetic cataracts cleared up by appropriate diabetic treatment.

When the blood pressure has been too high and has been reduced by rational means such as removing focal infections, overcoming chronic constipation, correcting errors of diet and increasing renal efficiency, I have repeatedly seen the beneficial effect in improving the vision of cataract cases in which it was previously gradually failing.

During the past fifteen years I have observed cataracts several times in excessive users of salt, and by correcting its abnormal use have seen as marked clearing of the lens as I have been privileged to witness from any treatment. This would indicate that it might be well to warn all our cataract cases against the immoderate use of salt.

In conclusion if cataract cases could have a thorough examination by an oculist and a physician I believe that in a very large majority a reasonably definite cause would be found and that in many of these patients it could be removed or favorably modified. When this is accomplished, clinical experience has demonstrated its value in either diminishing or arresting cataract. If this plan were more generally adopted I believe we would see one of the greatest triumphs of preventive medicine in the field of ophthalmology.

¹ *Semiology Diagnosis*, page 152.

² *American Encyclopedia of Ophthalmology*, page 1451.

³ *Archives of Ophthalmology*, Vol. XLI, page 42.

⁴ *Archives of Ophthalmology*, Vol. XLI, page 323.

⁵ *Laclinique Ophthalm*, Vol. XLI, page 11.

⁶ *Graefe's Archiv. f. Ophthal.*, Feb., 1908.

FOREIGN BODY LODGED, FOR YEARS, IN THE SUPERFICIAL LAYERS OF THE EYEBALL WITH REPORT OF A CASE.

BY

FRANK R. SPENCER, A. B., M. D.,

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Mr. C. M. S., Swedish, age 56, farmer, was first examined May 13th, 1908. He gave the usual history of asthenopia, which one would expect from a man of his age. In addition to this history, however, he stated that when eighteen years of age, while learning the blacksmith's trade in Sweden, he was struck in the right eye with a piece of steel. His eye pained

him for a time, but soon felt better and he didn't consult a physician.

V. O. D. 15/70 and J. No. 5; V. O. S. 15/30 and J. No. 7.

The anterior segment of the left eye was negative, but the right revealed a small piece of steel or iron, $1\frac{1}{2}$ mm. long by 1 mm. wide, imbedded in the episcleral tissue about 2 mm. from the limbus in the superior temporal quadrant. The upper lid covers the foreign body when the eyes are directed straight ahead; there was very little injection about the particle of steel; and, there was an absence of siderosis. The small size of the foreign body and the fact that it was well covered with the conjunctiva accounts largely for the absence of irritation. The well known tolerance of the sclera for a foreign body is also a factor.

The fundi were negative and he had orthophoria in both near and distant vision.

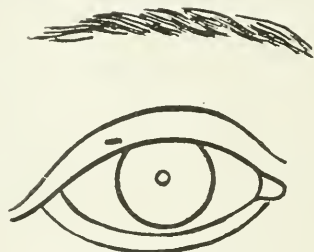


Fig. 1. Foreign Body Seen Through Upper Lid.

The keratometer showed 1.00 D. Axis 100— and 10 plus O. D. and 1.00 D. Axis 115— and 25 plus O. S.

V. O. D. was improved to 15/10— with a -0.75 combined with a -0.50 Axis 100 and V. O. S. to 15/10— with a -0.50 combined with a -0.75 Axis 115. He read J. No. 1 with a plus 1.25 sphere combined with a -0.50 Axis 100 O. D. and J. No. 1 O. S. with a plus 1.75 combined with a -0.75 Axis 115. He was given bifocals, but voluntarily refused to have the piece of steel removed.

The diagram above illustrates the location, size, etc., of the foreign body. This diagram shows the foreign body as if seen through the upper lid. The eyes having been turned down, when the injury occurred, the particle of iron or steel entered the episcleral tissue, obliquely from below, passing just under the free border of the upper lid.

His right eye was examined a second time March 3, 1912, to see if any change had taken place about the foreign body,

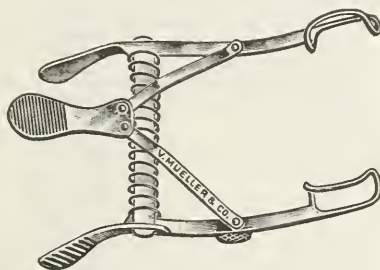
but no change in his condition was found. A third examination was made just recently, April, 1916, with the same result.

The author sees many cases annually with various foreign bodies lodged both superficially and deeply in the eyeball, but this case presents such an exception to the rule that it is unique. In fact, a careful search of the literature has failed to reveal a similar one.

AN EYE SPECULUM FOR CATARACT OPERATION.

BY
WILLIAM H. WILDER, M. D.,
CHICAGO.

I had the ordinary eye speculum modified for cataract operation in the following way. To the under surface of the arms of the speculum are attached the ends of two rather firm bars, the other ends of which are fastened to a small plate that



Wilder's Cataract Speculum.

serves as a handle. These attachments are all jointed so that they do not interfere with the ready opening or closing of the instrument. The purpose of the contrivance is to furnish a small firm handle, by means of which the assistant can at all times until the termination of the extraction easily and firmly lift the speculum away from the eyeball, and yet have his hand away from the arms of the instrument should the operator suddenly be required to remove it. One may thus more readily guard against a sudden closure of the lids that might result in loss of vitreous.

The bars that form the handle are not so stiff that they cannot be slightly bent if desired, to conform to the shape of the face of the patient. Such a handle could be attached to almost any model of speculum, but as shown in the cut, Messrs. V. Mueller & Co., have applied it for me to the model which I prefer. After considerable use of it I have found this instrument of real value.

A CASE OF PALSY OF THE EXTERNAL RECTUS MUSCLE WITH OPERATION.*

BY

C. M. HARRIS, M. D.,

JOHNSTOWN, PA.

On March 16, 1915, Mary R., aged seventeen, consulted me in regard to a left esotropia which proved to be paralytic. She was of poor Italian parentage and her eyes had at no time received any attention. The esotropia was first noticed in infancy and the amblyopia in the left eye dated back to her earliest recollection. Examination showed no movement of the left eye beyond the median line of the orbit, but other ocular movements were all that could be expected. In the primary position the strabismus was extreme.



Fig. 1. Primary Position.

The vision in the right eye was 6/12 which refraction and the wearing of plus 1.00 sph. plus .25 cyl. axis 90 improved to 6/7.5. With the left eye she saw fingers at one foot which was not improved by the —2.50 sph. indicated by retinoscopy. The irides were active, the media were clear, the right fundus revealed no lesions, but a spot of old choroiditis was observed adjacent to the temporal edge of the disc in the left eye.

On March 24, 1915, the left eye was prepared for operation, incision through the ocular coverings was made from the temporal edge of the superior rectus insertion, to a like point on the inferior rectus; the convexity of the incision being at

*Read before the Section on Eye, Ear, Nose and Throat Diseases of the Medical Society of the State of Pennsylvania, Philadelphia Session, September 23, 1915.

the insertion of the palsied muscle, which appeared as a flabby, pale, thin band. The temporal halves of each of the tendons of the vertical muscles were severed from their attachments and split backward for at least one-half an inch, and then sutured to the site of the insertion of the external rectus with black silk: a few other stitches approximated the coverings. A complete tenotomy of the internal rectus was done at this time.

The eyes were padded for about one week and considerable reaction took place, but the patient seemed quite comfortable. Three weeks subsequent to the operation she was discharged with a slight hyperesotropia in the primary position, but had practically full temporal rotation in the affected eye. When seen five months later conditions were the same, but patient stated that her asthma had been worse than usual during the



Fig. 2. Outward Rotation After Operation.

summer and the consequent depression after attacks, always caused more deviation of the eyes than was noted at other times.

While absolute permanent straightness was not obtained, it is possible that subsequent graduated tenotomies might improve matters, but the restoration of temporal rotation should in itself amply recommend the operation.

Nothing original is claimed in this case as the operation is referred to several times in the literature at my disposal, but I found very little data concerning cases where it had been actually tried. I see no reason why it should not be used under similar circumstances instead of advancement and tenotomy, which are at times recommended, or, absolute neglect.

REPORTS OF SOCIETIES

THE POLYCLINIC OPHTHALMIC SOCIETY.

DR. WM. ZENTMAYER, CHAIRMAN,

PHILADELPHIA, PA., JANUARY 13, 1916.

Subject: "Symposium on "The Ocular Changes Due to Brain Tumors."

Dr. John H. W. Rhein (by invitation): "The Neuropathology of Choked Disc." In discussing the neuropathology of optic nerve changes in brain tumor, it will be necessary to briefly refer to the mechanism of the production of choked disc or papillitis. Several theories have been advanced to explain this, of which it will be necessary to refer only to the backwater theory of vonGraefe, the inflammatory or toxic theory, and the mechanical or lymph space theory.

The backwater theory of vonGraefe explains the choked disc as being due to a venous stasis occasioned by the obstruction to the return of venous blood from the cavernous sinus, but this theory is not tenable since Sesemann demonstrated the anastomosis between the ophthalmic and the anterior facial veins.

The inflammatory or toxic theory as advanced by Leber and Deutschmann claims that choked disc is not merely a stasis but an inflammatory condition due to an irritation set up by the presence of a toxic fluid, this fluid becoming infected by reason of the intracranial disease or the lesion primarily causing the trouble. Deutschmann contends that it is due to a pathogenic microörganism. On the contrary, Duret did not see any action of microbes in the causation of Papilloedema.

Uhthoff, basing his theory on a study of 800 cases in literature and on his own experience, did not believe that the theory that choked disc was a primary inflammatory process was tenable, not that it had ever been successfully demonstrated that toxins of microörganisms were the cause of choked disc, the rare presence of choked disc in meningitis speaking against this theory. Inflammatory appearances, he concluded, were of a secondary nature. They were not always present in early cases. Bergmeister, Cushing, Spiller, Schick and others have disproved the presence of inflammatory changes in the early stages. On the other hand, Liebrecht found an inflammatory process in the neurilemma and Elschnig found inflammatory appear-

ance in all his cases. The latter stained his specimens by the Marchi method. Hippel, on the other hand, studied two cases by the Marchi method and found no inflammatory changes. Wildbrand and Saenger found that the inflammatory change was very insignificant and only was there any increase in the nuclei.

The theory which is generally accepted is the mechanical theory of Schmidt-Rimpler which is explained on a basis of increased intracranial pressure which forces an increased amount of subarachnoid fluid into the intersheath spaces of the optic nerve or into the lymph spaces, causing edema, congestion and lateral inflammation. This theory is supported by the experiments of Merz and those of Cushing and Bordley. According to Paton, Gordon Holmes and Schieck, lymph stasis is the cause of choked disc. Schieck found primarily the lymph spaces in choked disc extensively distended and he observed edema, swelling of the papilla, swelling of the nerve fibres, and secondarily, a reactive inflammatory appearance with proliferation of the connective tissue and of the glia. Later the same observer expressed the view that papilloedema was caused by the entrance of cerebrospinal fluid into the preformed perivascular lymph spaces of the axial bundle of the optic nerve and along the central vessels into the disk.

The cause is the excessive pressure of the fluid or intracranial pressure. Local stasis in the intravaginal space of the optic nerve, persistent decrease of the intraocular tension and collapse of the vessels of the axial bundle after profuse hemorrhage, were also factors. In a microscopic study of eight eyes he did not find any sign of inflammation. The perivascular lymph spaces in the central bundle were not closed, but were in open communication with the intervaginal spaces. The lymph space was extensively distended. Marked distention of the perivascular spaces around the branches of the central vessels, was characteristic. The filling of the lymph spaces was due to a flux of fluid into the lymph spaces in the peripheral direction and occurs at the lamina cribrosa, and owing to the counter pressure of the vitreous the fluid fills the perivascular spaces of the retinal vessels giving rise to an appearance of oedema. He experimented upon monkeys, producing increase in intracranial pressure, and believed that this experimental work shows that the papilloedema was due to the quantity of fluid and pressure

rather than to the quality of the fluid, and that the latter was not inflammatory.

The neuropathology of the choked disc can be summed up as follows: There is simple edema of the nerve stem, chiefly around central vessels, and hemorrhage into the nerve. The vaginal space is distended, and this is the seat of capillary hemorrhages and effusions, and also lymph and endothelial proliferation. The lamina cribrosa is humped and there is distention of the lymph spaces. The inflammatory cases show perineuritic changes. Varicosities, fanshape appearances, hypertrophy and swelling of the nerve fibres have been described. Perivascular round cell infiltration is present in inflammatory cases, and blood vessel changes consisting of thickened wall, occlusion of the lumen, and infiltration of the adventitia. The glia is proliferated and the connective tissue of the septa is thickened and infiltrated. The myelin sheaths present changes and there is atrophy of the nerve fibres, similar to changes found in the spinal cord following pressure. Experimentally, the nerve becomes edematous, the lamina cribrosa is distended by the edema, the papilla is pushed forward, the vessel becomes swollen, the vaginal space distended, and there is hemorrhage into the vaginal space, and in one case infiltration.

Dr. Charles R. Heed reviewed the classical picture of choked disc or papilloedema, and exhibited several paintings illustrating the ophthalmoscopic changes found in cases affected with brain tumor. A summary of other affections such as sinus disease, nephritis, grave anemias, serious intoxications, many of the acute infections, etc., producing changes simulating choked disc were discussed. The ophthalmoscope was lauded as the most valuable single aid in arriving at a diagnosis of brain tumors.

Dr. Walter W. Watson spoke on the disturbances of the ocular muscles in tumors of the brain. He said that intracranial disease as a menace to the integrity of the ocular muscles had been known for many years but only in a vague way until vonGraefe in 1854 first called attention to the appearance of the intraocular end of the optic nerve in many cases of brain tumor, when a new impetus was given to the study of the ocular muscles from like causes.

While symptoms due to pressure upon the nerves supplying the ocular muscles in their course from the base of the brain are so frequent as to be quite familiar to all clinicians,

symptoms following brain lesions due to tumors and degenerations in or near the cortical centres of these nerves are rather rare and therefore not well known.

Brain tumors may affect the nerve centers in the cortex of the brain known as the higher centers, or the nerve nuclei in the floor of the 4th ventricle when it is known as nuclear paralysis, or the lesion may be in the root fibres as they emanate from the nucleus and coalesce to form the nerve trunk just before leaving the brain, when it is specialized as fascicular paralysis. Tumors that affect the connections of the nuclei of the nerves with the cortex, Dr. Watson pointed out, do not in general cause paralysis of the individual muscles of the eye, but may in these situations affect the coördinate ocular movements; that is, convergence, divergence, and parallel movements. According to Willbrand there is an exception, ptosis.

The theory was supported that convergence and divergence are reflex phenomena with a possible centre in the cortex or optic thalamus, by quoting cases of cortical lesions from tumors in which there was paralysis of voluntary ocular motion with a preservation of reflex or automatic movements; yet it is undoubtedly true that loss of movements of convergence and divergence are probably brought about from lesions involving the tracts in the Pons and cerebral peduncles.

Tumors of the cerebellum may give rise to an inability of both eyes to travel to the right or left more than the median line, the eyes turning away from the side of the lesion. Small tumors of the Pons involving the abducens nucleus are likely to cause paralysis of lateriversion without a paralysis of convergence, the abducens affected being on the opposite side to that of the hemiplegia a point for differential diagnosis with cerebral tumors where the abducens involved is on the same side. In summing up he said that in the majority of cases where a tumor involving the Pons is associated with paralysis of ocular movements, either convergence or divergence is lost.

Attention was given to the fact that while paresis or paralysis of the sixth nerve may be strictly of localizing value, on the other hand it may be an indirect symptom of a tumor of large size in various regions of the brain and that a tumor to cause a simple paralysis of the sixth must be so situated as to cut off the emergent root fibres, that is, be a fascicular paralysis.

Function of the third nerve was interfered with in tumors involving the nerve nuclei, the corpora quadrigemina, or the

gray matter about the aqueduct of Sylvius, though complete paralysis may be produced by tumors involving the frontal or temporal lobes or the peduncle. Tumors of the pituitary body may produce symptoms indicative of involvement of the third, fourth or sixth nerves.

The pupillary reflex are is disturbed, according to Casper, when the lesion is near the sphincter nucleus or, as in Moeli's case, from a tumor involving both sides of the third ventricle. Anisocoria and hippus may be present in tumors involving the sphincter nuclei of the third nerve; and in the production of the Argyll-Robertson pupil Uhthoff places the lesion between the external geniculate bodies and the sphincter nucleus.

Lastly, Dr. Watson referred to nystagmus as being present with almost all cerebellar tumors, and in tumors of the quadrigeminae or frontal lobes it may be one of the chief symptoms.

Dr. Wm. Zentmayer, "**Changes in the field of vision in brain tumor.**" One of the early and not infrequent disturbances of the field of vision in brain tumor is recurring temporary obscuration of the entire field, that is, blindness. Such attacks may be uni-or bilateral. The frequency of their occurrence varies from several attacks daily to perhaps a single occurrence. They are probably due to vaso-motor disturbance or possibly arise from tumor toxemia.

Visual phenomena, such as phosphenes, scintillating scotomata or hallucinations, occur and when in association with hemianopsia usually occupy the dark field. They are not of localizing value although perhaps more common when the visual memory in the occipital region is affected.

Aside from field defects of a symmetrical nature, disturbances of the visual field in brain tumor are those resulting from the local effect of the papilloedema or optic atrophy. Perhaps the most constant change is that of enlargement of the blind spot. The peripheral defects vary, being influenced by the degree and character of the swelling. Thus a uniform swelling would produce a concentric contraction whereas a more **unequal** swelling would produce irregular contraction with possible re-entering angles. Some have explained binasal hemianopsia in this way. Interlacing of the color fields is probably of less diagnostic importance than was for a time believed. When the growth is so located as to produce pressure upon the visual tracts, either directly or indirectly hemianopsia results. Lesions in the anterior or posterior crotch of the chiasm may produce

bitemporal hemianopsia. In hypophyseal disease the development of the hemianopsia is usually gradual. Often the first indication is a slant to the upper outer limits of the field and this is usually manifested first in the color field. Even after a true hemianopsia has developed it may for some time be only a hemiachromotopsia. If you recall the arrangement of the fibres at the chiasm it will be clear to you why the hemianopsia produced by tumors at this position is apt to have very irregular dividing lines between the seeing and blind areas, often instead of a true hemianopsia we have only symmetrical defects. And it must not be forgotten that homonymous lateral hemianopsia is at least half as frequent as bitemporal. A characteristic of hemianopsia due to pituitary disease is the variability of the defect from day to day as it were, and the occasional spontaneous or postoperative recovery even after the lapse of years, showing that the defect had been due to a physiological blocking of visual impressions and not to destructive changes. The possible occurrence of central or symmetrical paracentral scotomata as an initial finding in pituitary disease must not be forgotten.

A growth pressing upon either the dorsal or ventral surface of the chiasm can produce either a superior or inferior hemianopsia. Binasal hemianopsia due to tumor must be of extreme variety as it requires a double lesion to produce it, such as could result from atheroma of cerebral vessels.

In lesions behind the chiasm, the dividing line between the seeing and the blind areas of the field is usually a vertical one commonly with preservation of the fixing point in the seeing area. There are exceptions, however, as in basal lesions occasionally the dividing line is irregular. The significance of hemiachromatopsia in lesions behind the primary centers is in dispute, some hold it to be the result of a cortical lesion of less intensity than where the loss of vision is complete. Another phenomenon said to indicate a cortical lesion is "vision nulle," a condition in which the patient is unconscious of the field defect. Altitudinal hemianopsia can be produced by lesions of the calcarine area. It is probable that the lesion is a homolateral one. A double homonymous hemianopsia may result from a growth invading both hemispheres.

It is obvious from what has been said that hemianopsia of the homonymous type is of little localizing value in itself, but in association with other symptoms such as disturbances of

pupillary reactions, oculo-motor and other cranial nerve palsies, speech defects, fundus changes, hemiplegia and hemianesthesia, etc., its presence assists in localization.

WALTER W. WATSON,
Secretary.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

M'CLUNEY RADCLIFFE, M. D., CHAIRMAN.

FEBRUARY 7, 1916.

A Case of Mikulicz's Disease.

Dr. William Campbell Posey showed a case of Mikulicz's disease in a colored woman twenty-one years of age, the subject of both tuberculosis and syphilis. Five out of six remaining teeth were decayed, and the gums inflamed.

Dr. Posey referred to Dr. Ziegler's monograph upon the subject, and his theory of the nasal origin of the disease, with transmission of the infection through the lymphatic capillaries. The young woman referred to was receiving a supportive treatment and, in addition, cod-liver oil, iron and mercury.

Dr. Ziegler said that the etiology of Mikulicz's disease was obscure. All examination had failed to show infection of any kind. The disease had, he stated, been observed to subside in the presence of some intercurrent infection, with a recrudescence after the secondary disease had been cured. He thought it was due to a lymphoneurosis of an obscure type. The cases he had observed were all improved by increasing the process of oxidation. The disease is not confined to any one country or race.

Dr. Zentmayer called attention to the very marked drooping of the outer half of the upper lid, giving rise to an appearance that had been so well described in Dr. Ziegler's paper as the "blood-hound eye."

Ulcer of the Cornea, Treated by the Desiccation Method.

Dr. William Campbell Posey showed a case of epithelial infiltration of the cornea, of traumatic origin, resembling, in many ways, the disciform keratitis of Fuchs, which had shown marked and rapid improvement under one application of the desiccation method of Clark. He said that such cases, in which the terminal nerve filaments had doubtless suffered trophic changes in consequence of injury, resisted treatment, as a rule; and he was convinced that the electricity had shortened the healing process very markedly.

Melanosarcoma of the Conjunctiva.

Dr. Posey also showed a case of melano sarcoma of the conjunctiva, in its second recurrence, which had also been greatly and rapidly alleviated by desiccation treatment. The sarcoma, which was diffuse and had invaded the bulbar conjunctiva chiefly in its upper and inner and its lower and outer segments, had been primarily removed ten years before. A second operation had been performed for recurrence five years later. The second recurrence was characterized by a general diffuse infiltration of the sarcomatous mass through the conjunctiva, in the regions referred to, and some superficial involvement of the cornea. The swelling and irritation caused by the sarcoma, and much of the pigmentation, disappeared two weeks after electricity had been applied.

Metastatic Gonorrheal Iritis.

Dr. Posey showed two men with binocular iritis, due to metastatic gonorrhea: the first in a man fifty-five years of age, five years after the urethritis had been contracted; the second, in a man twenty-five years of age, one year after his local infection. In both cases there had been an extensive extravasation of lymph into the anterior chamber. Both resisted treatment until a paracentesis of the anterior chamber was performed, following which, tension, which had been high, was lowered, and a marked amelioration of the inflammatory symptoms took place. Dr. Posey agreed with the view that, he said, is now held by genito-urinary surgeons, that gonorrheal bacterins are of no service in the treatment of iritis due to metastatic gonorrheal rheumatism.

Embolism of the Central Artery of the Retina.

Dr. P. L. Balentine presented this case because of the interesting condition of the blood-vessels. The patient gave a history of previous attacks of fever, and a cardiac examination revealed an aortic stenosis with a mitral regurgitation. When first examined, in addition to the usual signs of obstruction of the central artery, the blood in those arteries which were not entirely empty was broken up into small, regular sections, with spaces between. The whole bead-like column moved in an irregular, jerky fashion towards the disk, instead of towards the periphery.

Dr. Zentmayer said that the beaded, or broken-up column of blood appearing in the arteries in some of these cases could

be explained by the fact that at the systole of the heart, a small amount of blood is forced by the obstruction; and that, immediately following this, the vessel collapses under the pressure of the intra-ocular tension—this occasioning a clear space. Then, with the next contraction of the heart, another small quantity of blood is forced into the artery; and again, during diastole, the vessel collapses—thus forming an alternation of a segment of blood with a clear space, the whole circulating very slowly.

Dr. Griscom thought that the reversed flow of the arterial current was of unusual interest, and recalled having seen the same condition in a case of embolism of the central artery presented to the Society by Dr. D. F. Harbridge, several years ago.

Subconjunctival Dislocation of the Lens.

Dr. William Zentmayer presented a woman, sixty-one years old, who had been struck over the lower lid by a piece of wood, one week previously. The lower lid of the left eye was slightly ecchymosed, and there was a subconjunctival hemorrhage below the cornea. There was a horizontal groove across the upper field of the cornea, produced by a bulging forward of the portion of the structure above this. When the eye was rotated downward and the upper lid elevated, there came into view a translucent, hemispherical mass, the lower border of which reached almost to the upper margin of the cornea. The overlying conjunctival vessels were congested. No view of the fundus was obtainable, owing to intraocular hemorrhages. Dr. Zentmayer purposed to remove the lens after a plan used recently by Krauss. In this procedure, a purse-string suture is first passed through the conjunctiva above the base of the swelling. This is gradually drawn upon, after an incision has been made through the overlying conjunctiva; the lens being thus extruded, and the scleral rupture covered, simultaneously. (NOTE.—This operation was done on the following day. After expulsion of the lens, a rupture of the sclera was found, about one centimeter in length, and parallel to, and about two millimeters from the corneal margin.) The rupture, Dr. Zentmayer stated, usually occurs over the sclerocorneal limbus; as this is the weakest part of the outer tunic of the eye. It is in this position that is found the canal of Schlemm, with the weak pectinate ligament forming its outer wall. A further weakening is caused by the perforating vessels.

Dr. Chance said that he could not recollect having seen more than one other case, that which he had seen in Dr. Oliver's service, while resident physician in the hospital. It was that of an aged farmer who had been horned by a cow. In appearance, the condition was startling; and Dr. Chance was then filled with wonder as to how such an accident could have occurred. He still wonders, he said, how it is that with such a blow as can dislocate the lens beneath the bulbar conjunctiva, the eyeball itself is saved from laceration, if not complete destruction. He believed that in that case the lens occupied a position below the cornea, and not above, as in Dr. Zentmayer's.

The Ocular Aspects of Leprosy.

Dr. Burton Chance read a paper detailing the ocular relations of leprosy. After a brief historical sketch of the disease, he spoke of its geographical distribution, and then described the affection in its general aspect, before treating of its manifestations within the ocular structures. He stated that leprosy of the eye is always a matter of secondary invasion, and that it is rare to find a long-existent case that has not, at some time, shown affection of the eye or of its appendages. The statistics of different observers, he continued, vary, both as to the types of the disease and as to the character of the endemic prevalent in their different countries. Borthen, in Norway, found the eyes affected in seventy-five per cent. of *mauco-anesthetica*, and in ninety per cent. of those of *lepra tuberosa*; while De Silva, in Siam, out of five hundred cases, saw one hundred and one.

Besides the lids and brows, all structures of the eye have been found affected; but bacilli have not been discovered in the lens, nor true leprosy processes active in the optic nerve. The disease is largely limited to the anterior segment, the ciliary region being especially susceptible. Nodules have been found on the cornea and on the iris, as well as in the ciliary body.

Keratitis, both superficial and deep, chronic and unrelenting, attacks the cornea; while abscess and ulceration supervene, from tarsal and conjunctival disease. Frightful destruction and distortions ensue, from the effects upon the lids and the bulb.

The disease is due to the *lepra bacillus*, discovered by Hansen, a bacillus that greatly resembles the tubercle bacillus in appearance; but, so far, it has not been found to be inoculable in man. It may be scattered throughout the system, but is rarely discovered in the blood, although it is probably carried by the

blood and lymph streams. The incidence of ocular symptoms bears no relation to the duration of the general disease, but may come on at any time in its course; although it is not usually found until several years have passed. The disease sometimes seems to have "burnt itself out," and the patient then suffers from the effects of the malady. Tubercular leprosy is more disastrous than the other forms: although the anesthetic, if it continues to exist, is followed by blindness.

By most leprologists, the influence of the contagion is considered to be as small as that of tuberculosis, or even smaller. While the exact method of inoculation is not known, it seems not unlikely that it may be by the mucous membrane of the mouth, nose and conjunctiva. It is well, therefore, for patients to prevent its spread by contamination from fingers, towels, cloths, etc.

There are no specified remedies, and the ocular lesions are to be managed upon general ophthalmological principles. Certain observers, having in mind the fact that the bacilli do not penetrate scar-tissue, have boldly scarified the pericorneal zone, to prevent an invasion of the ciliary region. Nodules may be excised; and much, it is believed, may be done by means of the X-ray and other radiant agents. It is hoped that a serum available for both prophylaxis and cure may be discovered, for it cannot be denied that leprosy is susceptible of arrest and cure.

The Uses of the Desiccation Method in Ophthalmology **A Report of Cases Treated from the Clinics of the Wills Eye** **Hospital**

Dr. William L. Clark said that the desiccation method had been found useful in treating growths of the lids, canthi and conjunctiva. Among the cases treated were epithelioma, round-cell and melanotic sarcoma, xanthoma, warts and moles, corneal ulcer, pterygium, granular conjunctivitis and corneal opacity. Dr. Clark explained that since epitheliomata of the lids and canthi are usually of the basal-cell type, are slow of progression, and seldom metastasize, they may be treated more conservatively than those of the prickle-or cuboid-cell type, which progress rapidly and metastasize early. By the desiccation method, these lesions may be successfully treated, with superior cosmetic results. Should there be a recurrence, a second treat-

ment may be applied, without great disadvantage to the patient; but this seldom occurs, if the epithelioma is localized.

Fourteen cases of epithelioma from Wills Hospital had been treated by this method, Dr. Clark stated. Eight had not recurred in periods extending from four months to two years, after one application. Two cases recurred, and were controlled by a second application. Two were very advanced, and the result was only palliative. Two were still under treatment at the time of the report, not being yet healed.

Two cases of round-cell sarcoma of the lids, both recurring after excision, had been treated. One recurred in nine months after the desiccation treatment, and was then under treatment again. There had been no recurrence, four months after treatment, in the other case.

Four melanotic sarcomas, involving the cornea, the limbus, and the bulbar and palpebral conjunctiva, were treated. One had not recurred in seven months; and another, in three months. The other two had been but recently treated, and were still under observation.

Three cases of xanthelasma, a total of nine lesions, were treated successfully, with excellent cosmetic results. Two cases of warts and moles of the lids, a total of eight lesions, were likewise successfully treated.

One chronic corneal ulcer, which had resisted other methods of treatment, showed a marked and rapid improvement with one desiccation treatment.

Two cases of granular conjunctivitis were treated with success with one application of desiccation.

Two corneal opacities were treated. In one, the sight was distinctly improved. In the other, sufficient time had not elapsed to determine the result.

A report of all ophthalmological cases treated by this method, from all sources, was being prepared.

Dr. Clark considered the advantages of the desiccation method in ophthalmology to be that local anesthesia could be used, that the blood and lymph channels were sealed at once, that the control was perfect, that large or small areas could be destroyed, that the cornea might be treated safely, that no contracted cicatrix followed, and that, hence, these were good cosmetic results.

J. MILTON GRISCOM, M. D., Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

DR. G. L. STRADER, PRESIDING

DENVER, MARCH 18TH, 1916.

Concussion Annular Cataract.

Dr. A. C. Magruder presented R. S., aged 14, who on Jan. 5th, 1916, had his head caught between the door and the door-jamb. Two days later his eye began to get red and very painful. First consulted me on Jan. 11th, at which time there was intense photophobia, pain and redness. Media clear, except a long stringy opacity in the vitreous and very slight, deep, lenticular cloudiness. Temperature 99.5. Atropine was at once used and pupil dilated about 2/3.

This condition remained until Jan. 22nd, when on account of poor home treatment the boy was sent to the hospital where he remained until March 3rd. During all this time he ran a temperature of 99 to 100, with normal noon temperature. Typhoid or T. B. was strongly suspected but both Widal and Moro reactions were negative.

K. I. was given, as much as 20 gtt. t. i. d., with the hope of absorption of the vitreous opacities and atropine used constantly.

From Feb. 4th to 16th I was in Chicago and atropine was not pushed as it should have been and upon my return I found the pupil very much contracted and area cloudy. Atropine in substance failed to dilate the pupil more than 1/2 and pain, redness and photophobia continued.

Feb. 20th, 25 mg. of a 5% sol. of dionin with 1/50 gr. atropine sul. to dram i. was given subconjunctivally. Eye improved in all its phases except lens opacity. Vitreous opacity now much less. These subconjunctival injections were repeated Feb. 23rd and 28th and March 3rd. The pupil dilated ad maximum except in lower area, but it requires the daily use of atropine in substance to maintain the dilatation. The pain, photophobia and redness have disappeared.

There remains the vitreous opacity and what appears to be a concussion annular cataract (Vossius type), but on the posterior capsule, which is quite out of the ordinary, and it is for this reason that the case is presented.

Blows on the eyes or head, falls or jumps, sitting down or slips on the pavement, convulsions, tetanus, lightning strokes, are cited as being causative of concussion cataract. Deutsch-

mann reported two cases of partial, transient opacity of the lens in wounds of the sclera near the sclerocorneal margin. Becker reports one case of concussion cataract without rupture of the capsule: Falling icicle struck sclera but did not rupture it, but produced a rent in the choroid. Three weeks later opacity of the lens about the size of a moderately dilated pupil.

Can cataract take place from concussion or must the capsule of the lens have been ruptured?

DISCUSSION.

Dr. Edward Jackson believed the opacity to be in front of the posterior capsule, possibly near the nucleus and about its periphery.

Dr. Matson asked if fracture of the orbit could have produced the temperature?

Dr. E. T. Boyd thought the opacity to be anterior to the posterior capsule and believed it to be of the nature commonly recognized as concussion cataract.

Dr. Magruder in replying to question concerning the site of injection, said that when he had found synechia in a certain part of the eye that injection in that region had seemed to give the greatest benefit.

Lens Dislocated into the Vitreous.

Dr. E. T. Boyd presented a man 65 years old who, one week before had received a blow upon the eye and had since been unable to see. The fundus can best be seen with a plus 9 D. and the vision is improved with such lens. No lens reflex can be obtained and the iris is tremulous. The lens cannot be located. This however may, and probably will be possible later as the lens becomes hazy.

Dr. Thompson suggested that a blow upon the forehead, with head inclined forward, might serve to displace the lens into the anterior chamber.

Dr. Boyd said that the case would be kept under observation and the lens removed if conditions became favorable.

Foreign Body in Vitreous. Cataract.

Dr. E. E. McKeown exhibited a man with the following notes: "Piece of steel struck right eye about one year ago. Cataract didn't start until several months after. Had no physician at time of injury. X-ray shows foreign body in floor of vitreous. Mature cataract present, for which two needlings have been done."

DISCUSSION.

Dr. Boyd said that as a general proposition he considered it bad practice to needle a lens of an eye in which there was a foreign body, and in this case, to say the least, it was inadvisable. The presence of steel or iron in the vitreous may at any time cause iridocyclitis and anything in the way of needling might easily precipitate such attack. A scleral incision for magnet operation, or a large keratome corneal incision, breaking up lens matter and removing same by irrigation, followed by the introduction of magnet point with the hope of removing f. b. would have been rational procedure.

Dr. McKeown stated that the patient would not listen to an operation suggestive of attempts to remove the foreign body.

Dr. Edward Jackson said that in such event his treatment would have been to send the patient to someone else, as foreign body in the eye is handicap to any operative interference.

Dr. E. R. Neepser said that he would not use magnet unless the sideroscope demonstrated that the foreign body was magnetizable.

Impairment of Vision from Drinking Wood Alcohol.

Dr. G. L. Strader presented Mr. S., aged 59. Jeweler.

November, 19th, 1915, patient by mistake took two drinks of wood alcohol. Drank about two ounces at one o'clock in the afternoon, and three or four hours later took another drink of about the same amount. November 20th felt exceedingly nervous and called his physician. Nov. 21st vision was rapidly failing. Awoke the morning of the 22nd totally blind. No headache and no gastro-intestinal symptoms at any time. Patient had been a hard drinker for a great many years. Two and a half years ago took the Gatlin cure, after which did not drink for two years. Estimates that he drank as much as a quart of whiskey during the last half of 1915. Has smoked eight or ten heavy cigars a day for years. Nov. 26th began to distinguish light from darkness. From that date until December 10th, when I first saw him, there was slow improvement.

O. D. V. Fingers, 12 in. O. S. V. Fingers, 24 in.

Pupils moderately dilated and very sluggish in reaction. Absolute color scotoma. Slight retinal congestion, otherwise fundus of each eye normal. Absolute central scotoma for form. Blood pressure 160. Patient put in hospital. Alcohol and tobacco interdicted. Strych. nit. hypodermatically in in-

creasing doses. High frequency current five minutes daily. Gradual improvement.

December 18th. vision R. E. fingers 24 in.; L. E. fingers 10 ft. Went home to have treatment continued by family physician. Was getting 1/10 gr. strychnine three times a day. Improvement in vision continued until March 1st. at which time vision was reported as being R. E. fingers 10 ft.; L. E. 20 200. Since March 1st vision has been failing, and on March 17th equalled fingers at one foot for the right eye, and 10 feet for the left eye.

There is marked light irritation. Nerve heads are pale, considerable headache. Dr. Strader asked concerning the probable outcome of the case.

DISCUSSION.

Dr. Jackson feared that the man would go totally blind, and as the man was drinking and smoking a little this would tend to such result. Would watch the man for appearance of sclerosis.

Dr. J. A. Patterson asked if purgation could get rid of wood alcohol?

Dr. Thompson cited a case of alcohol amblyopia that consulted him after being blind three weeks and in which he had sweat the man and given him calomel, effectually restoring vision. (This condition was due to grain, not wood, alcohol.) Dr. Thompson said that he did not believe strychnia was of any use in such cases.

Dr. W. H. Crisp said that he thought that the value of strychnia had been overestimated.

Dr. Boyd thought that Dr. Strader's patient would ultimately become totally blind.

Result of Operation for Symblepharon.

Dr. Bane showed a patient who had burned her eye with lye, resulting in extensive symblepharon, for which he had operated. The cul-de-sac is now of normal depth and the eye in ideal condition.

Ethyl-hydro-cuprein Hydrochloride in Streptococcic Conjunctivitis.

Dr. W. H. Crisp reported a case of very severe streptococcic conjunctivitis in which rapid improvement had followed the use of ethyl-hydro-cuprein hydrochloride. The man was 73 years old. The severity of the inflammation was such that

the chemosed conjunctiva of the eyeball overhung the cornea, the swelling of the lids and surrounding tissues was somewhat indurated, and there was so much pain in the surrounding parts of the head and face as to suggest an inflammation of the deeper structures of the eyeball. The pus, which was very profuse, yielded a pure culture of a virulent strain of streptococci. Vigorous use of silver-nitrate solution and argyrol, extending over a number of days, produced scarcely any improvement. Under the use of one per cent solution of ethyl-hydro-cuprein hydrochloride thoroughly rubbed into the conjunctiva of the lids, and a 1 to 180 solution of the same drug every hour at home, there was very rapid recovery from all the symptoms.

Glaucoma in a Boy of Nine.

Dr. Edward Jackson reported the case of a boy of nine years, whose eyes were supposed to be normal, until last fall dilatation of the right pupil was suddenly noticed without pain or discomfort. On examination the right disc was found deeply cupped and the field much restricted, with tension of the eye plus 1. Vision normal. In the left eye there was then slight cupping of the disc; field and central vision normal.

In spite of eserine, which kept the pupil well contracted, the eyes had grown worse until vision is: Right 0.3, eccentric, T. 75 mm., cup 6 D. deep. Field for bright flash light in dark room, less than 30 degrees in the greatest diameter. Left,

35

vision 1.2, T. 65 mm., cup 5. D. Deep. Field: 65 L. 10

15

Iridectomy was advised, first for the right eye, and if successful in reducing tension, on the left, meanwhile keeping up the full effect of eserine.

Dr. Jackson said that this was the youngest case in which he had seen glaucoma develop.

Proptosis of Eye-Ball.

Dr. J. A. Patterson reported the case of a man, 50 years old, who three days before consulting him, had gotten up in the morning and found right eye proptosed to such extent that the lids would not cover the eye. No pain. Eye grounds and fields normal. X-ray showed the ethmoid and frontal to be clear. Luetin negative. Upward, inward and downward movements of the eye are limited. Suggestions as to cause asked.

Dr. C. A. Walker had a case very similar. All sinuses

normal. Incised outer canthus to prevent pressure; later saw some protrusion incision of which demonstrated the presence of pus in the orbit. Patient doing well.

Dr. Jackson said that hemorrhage into the orbit sometimes produced such conditions.

E. T. BOYD, Secretary.

CORRESPONDENCE

"EYE INJURIES FROM BROKEN SPECTACLES."

Editor OPHTHALMIC RECORD:

As there seems to be a revival of interest in this subject, and I was not a participant in the Vreeland "questionnaire," I make bold to offer additional data. In almost 37 years of practice, with a fair sprinkling of injuries, I have seen, all told, but five that come directly and indirectly in this class. The first two were trivial: were incurred in almost identical manner, viz: chips from lathes; and required nothing but the removal of small pieces of glass from the cul de sacs. The third, inherited from a colleague whose vacation was due, was in its fifth week after extensive laceration at the outer limbus, had well marked irido-cyclitis, and did not long delay the enucleation. (This was an injury from a rimless eye-glass lens forced into the eye when struck and broken by a flapping window shutter.)

The fourth, seen in consultation with another colleague, had the night before stooped over, in a darkened room, to do something about his shoes and collided with a chair post, shattering one lens (concave) of his rimless spectacles and driving a fragment into the eye, so that there was a linear perforation of the cornea from the center downward to the periphery, with large prolapse and hyphemia. The prolapse was cut off and the eye retains some useful vision.

The fifth, now under treatment, and first seen a week after the injury, is an almost central perforating wound by a broken spectacle temple; not a break in situ, just minus the bulbous tip as we so often seen them worn. This injury was incurred by an attempt to put the spectacles on with one hand. There are extensive synechiae, some pupillary exudate and in the little to be seen of the lens, probably a pin hole in the capsule. All five were adult males; one and two, machinists; three and

four, commercial travelers; and five, a street car conductor. Two and four were myopes. Vreeland's conclusions are therefore in the main supported. It only remains to be said that the bad habit of wearing tipless temples is not without serious possibilities to the eyes, as well as discomfort to the ears.

H. B. YOUNG.

Burlington, Ia., June 4th, 1916.

May 14, 1916.

To the Editor of the OPTHALMIC RECORD:

Dr. Zentmayer has just called my attention to the fact that in 1908 he reported in the *Annals of Ophthalmology* a case of contracted socket in which he had used a glass ball to hold a Thiersch graft in position. I regret that I was not previously aware of this fact so that I could have given him credit for this procedure in my paper in the March issue of the *Ophthalmic Record*.

Since my paper was written I have had a case of contracted socket in which an additional procedure was necessary before an artificial eye could be worn. In this case it was necessary to make an entirely new socket, and the resulting cavity was so deep that the artificial eye did not maintain its proper position. I reduced the depth of the socket, and thus overcame this difficulty, by incising and undermining the posterior wall of the cavity and permanently implanting a large glass ball in the orbit.

Very truly yours,

F. H. VERHOEFF.

54 Welbeck St.

Cavendish Sq., London, W., June 7th.

Editor, THE OPTHALMIC RECORD.

Sir: I shall take it as a very great favour if any of your readers, who publish articles on the subject of glaucoma or allied conditions, would be so very kind as to send me a reprint of their articles.

In connection with my work of writing the chapter on glaucoma for the Ophthalmic Year Book, I have experienced the greatest difficulty in obtaining copies of articles which have appeared in some of the less widely circulated American Jour-

nals. Indeed, it is quite impossible to obtain some of these anywhere in London.

I am very anxious to make my review of the subject as comprehensive as possible. I shall be grateful for your assistance and for that of your readers.

Yours truly,

R. H. ELLIOT,
Lt.-Col. I. M. S. Ret-d.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM—ANNUAL CONGRESS.

The Congress was held in London, May 4th, 5th and 6th, presided over by Mr. Walter H. Jessop. The meeting was held at the Royal Society of Medicine, where a scientific museum was arranged. Clinical cases were shown at the Central London Ophthalmic Hospital. Mr. Jessop's address dwelt on the ophthalmic lessons derived from the war.

He mentioned particularly the absence of sympathetic ophthalmitis as a result of serious wounds of the eye. It seemed to be proved that papillœdema was due to increased intracranial pressure. The discussion of "Foreign Bodies in the Eye and Orbit," was opened by Mr. Herbert Parsons and Mr. A. L. Whitehead.

"The Treatment of Syphilitic Eye Affections by the Newer Methods," was discussed on the second day of the meeting. Mr. J. B. Lawford and Mr. S. H. Browning lead the discussion.

The various new drugs were compared, among them salvarsan, neo-salvarsan, galyol, biargol, Kharsivan, nitramine and luargol. The report of Mr. Leslie Paton of the Committee on Detachment of the Retina showed that British figures were better than those of any other country. The museum was organized by Mr. Stephen Mayou and deserves much praise. Mr. Mayou also exhibited a combined electro-magnet and telephone probe.

The following officers were elected to serve during the years 1916-1917: President, W. H. Jessop; Vice-Presidents, F. Richardson Cross, A. Maitland Ramsay, Sydney Stephenson, and Treacher Collins; Treasurer, James Taylor, M. D. Council, Elmore Brewston, A. J. Ballantyne, W. Halliburton McMullen, Gordon Holmes, M.D., J. Craig (Belfast), and H. L. Eason; Secretaries, S. A. K. Wilson, M. D., and M. Stephen Mayou.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. S. R. Edwards of Calumet, Mich., spent the month of March attending clinics in New York.

Dr. C. Fred Pollock of Dumfries, Scotland, died recently at the age of 67.

Dr. Antonio de Menacho died in Bordeaux, France, at the age of 25.

Dr. Gourfin has been made professor of clinical ophthalmology in the University of Geneva.

Dr. A. B. Middleton of Pontiac, Ill., has been appointed First Lieutenant, Medical Reserve Corps. U. S. Army.

Dr. Derrick T. Vail has resigned from the senior staff of the Cincinnati General Hospital after a service of fifteen years.

Dr. Emile G. Nadeau has moved from Chicago to Green Bay, Wisconsin.

Dr. Hanford McKee of Montreal, Lieutenant-Colonel in the Canadian Army Medical Corps, has been made a Companion of the Order of St. Michael and St. George in recognition of professional services in England and France.

A verdict of \$2,400 has been rendered against a firm of manufacturers of golf balls in Newark, N. J., as a result of the destruction of an eye from the acid contents of a ball.

Dr. E. T. Conant of Denver was elected treasurer and Dr. Frank R. Spencer of Boulder secretary of the Colorado Ophthalmological Society for the coming year.

The following deaths in the profession are announced:
Prof. M. Straub of the University of Amsterdam, aged 57.
Dr. Lyman Ware of Chicago, aged 75.

The following constitute the ophthalmic staff of the Cincinnati General Hospital: Dr. Victor Ray, chief ophthalmic surgeon; Dr. Jesse S. Wyler, ophthalmic surgeon; Dr. Frederick W. Lamb, junior ophthalmic surgeon.

The Summer Graduate Course in Ophthalmology at the University of Colorado will be given June 19th to July 29th. This year it will include a two-hour period, four days in the week, of laboratory work in Histology and Pathology of the eye. There will be a series of lectures on special topics by well known men in the profession, outside of the University Faculty.

At the recent meeting of the American Medical Association at Detroit, Dr. Wm. Zentmayer of Philadelphia was elected chairman; Dr. Cassius Westcott of Chicago, vice chairman; Dr. Geo. S. Derby of Boston (re-elected), secretary, and Dr. Phinizy Calhoun of Atlanta, Georgia, section delegate to the House of Delegates.

Among the many notable incidents of this very popular gathering of ophthalmologists (360 section members signed the roll) was a dinner, given by Dr. Walter Parker, the retiring chairman, to ex-chairmen of the section. It was attended by some nineteen former presiding officers and a happy and profitable reunion was the result.

NEW BOOKS

"The Mortality From Cancer Throughout the World," by Frederick L. Hoffman, LL.D., F.S.S., F.A.S.A. Statistician, The Prudential Insurance Company of America. The Prudential Press, Newark, New Jersey.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Pol.) R. B. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suker (P.-G.) C. H. Francis (Pol.) A. Duncan (P.-G.) A. G. Wipperf (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Pol.) H. N. Lyon (P.-G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Pol.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wipperf (E.E.N.T.)	C. H. Francis (Pol.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.)	S. M. Hager (Pol.) G. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wipperf (E.E.N.T.)
10 A.M.	Brown Puscy (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Bink (N.W.U.) Every day, 10-12 A. M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) M. Goldenberg (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) J. B. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) *Paul Guilford (St. Luke's) D. W. Eiss (Inf.) E. R. Cressley (Inf.) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) D. W. Eiss (Inf.) E. R. Cressley (Inf.) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	C. H. Francis (Pol.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.)	S. M. Hager (Pol.) G. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wipperf (E.E.N.T.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2.5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2.5	C. W. Hawley (P.-G.) 2.5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2.5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2.5 H. N. Lyon (P.-G.)	

ABBREVIATIONS:

*Special operative eye clinic.

County: Cook County Hospital, W. Harrison and Honore Streets.
 Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.
 M. H.: Mercy Hospital.

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.
 E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

Pol.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.
 P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.
 N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.
 St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.
 U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE OPHTHALMIC RECORD

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CHRONIC INFECTION OF THE FAUCIAL TONSILS, AS A CAUSATIVE FACTOR IN THE PRODUC- TION OF PARALYSIS OF THE ACCOM- MODATION WITH THE REPORT OF TWO CASES.*

BY

C. A. VEASEY, M. D.,

SPOKANE, WASH.

During the past few years much literature has accumulated concerning the role of focal infections in the production of various diseases. The gastro-intestinal tract, the kidneys and the eye seem particularly vulnerable and many affections of these portions of the human anatomy have been recorded. The tonsils, both faucial and pharyngeal, the teeth and the accessory nasal sinuses have been particularly active as foci of infection and are believed by Rosenow, who has done so much work along these lines, to be the principal ports of entry, though affections of the ear, the urethra, prostate, seminal vesicles, intestines and rhino-pharynx have also played their parts as causative factors.

Experimentally I know of a young man who had repeated attacks of rheumatism from whom chronic, inflamed tonsils were removed and cultures of the microorganisms obtained from these tonsils injected into guinea pigs produced an arthritis.

Fischer of the Mayo clinic at the meeting of the American Ophthalmological Society last month reported a case of choroidal changes from whom chronic, diseased tonsils were removed and cultures made from these tonsils and injected into rabbits produced choroidal changes.

These experiments would seem to indicate, as Rosenow pointed out some time since, that the microorganisms found in chronic, diseased tonsils seem to have selective action.

So far as I have been able to ascertain in a brief search

*Read at a meeting of the Pacific Coast Oto-Ophthalmological Society, Portland, Oregon, June 22-23-24, 1916.

of the literature no cases of paralysis of accommodation due to focal infection have yet been recorded. The following histories, therefore, are of sufficient interest to warrant the reports.

Mr. A. S., aged 29, an attorney, unmarried, consulted me on March 10, 1916, because of impairment of vision in the right eye which had been present for nearly five weeks. He stated that about two years before he had had a somewhat similar trouble of one eye which was accompanied at that time by moderate dilatation of the pupil. A year later, that is one year prior to his visit to me, the same condition was repeated. He could not recall whether the condition appeared in the same eye each time or whether different eyes were affected. The condition occurring two years ago and again one year ago lasted only a few days, the symptoms being dilatation of the pupil and inability to read with the affected eye.

The present trouble first presented itself nearly five weeks ago and was confined to the right eye. He consulted an optician who gave him glasses but he obtained no relief and the condition remained unchanged.

The vision of O. D. equaled 6/5 and the accommodation was found to be completely paralyzed. The vision of O. S. equaled 6/5 and the patient read Jaeger 1, p.p. 7½ inches. The pupil of O. D. was moderately dilated.

The patient's health, excepting the eye trouble, was exceedingly good. Examination of his nose showed a markedly deviated septum and a very moderate hypertrophy of the lower turbinates, but no free pus could be found in the nares and the sinuses transilluminated perfectly. Examination of his throat revealed deeply buried, adherent tonsils with large crypts filled with cheesy debris, and there were also a number of large, yellowish spots beneath the tonsil surface with no external communication. The Wassermann was negative as was also the urinary test. No pyorrhea was present.

The patient was advised to have his tonsils removed with the idea that there might possibly be a focal infection as a causative factor for his paralysis of accommodation and told that subsequently several weeks' treatment would probably be required. The patient was treated for a week without any change appearing in the condition of the eye. Tonsillectomy was then performed under general anaesthesia. Four days later the patient read Jaeger 3 slowly with the affected eye

and two days later, or six days from the time of the operation, the accommodation was entirely restored, the patient easily reading Jaeger 1 at 13 inches.

The notes of the following case were kindly given to me by my associate, Dr. Wilson Johnston, in whose practice the patient was seen.

J. C., a male student, aged 17 years, had attack of tonsillitis Nov. 7th, 1915, at which time he was seen by Dr. M. M. Patton who made a culture from the throat and found it negative for the Klebs-Loeffler bacillus. Recovery was slow and the patient had not entirely regained his strength six weeks later when he had a recurrence of the throat symptoms and was treated by Dr. E. R. Northrop for an acute follicular tonsillitis which subsided in a few days. On Jan. 3, 1916, he was referred to Dr. Johnston because of his inability to see near objects. Examination showed him to be pale and his general appearance was that of one suffering from a severe toxemia. Both of his pupils were dilated and did not react to light. The central vision for each eye was 6/6, but he was unable to read Jaeger type without the aid of a strong convex lens, and the accommodation was found to be paralyzed in each eye. There were no ophthalmoscopic changes. Examination of his throat showed the tonsils to be hypertrophied and sub-acutely inflamed. The right tonsil was twice as large as the left. Pus and debris could be expressed from the follicles of both. Suspecting that the condition might be one of post-diphtheric paralysis a culture was again made for the Klebs-Loeffler bacilli, but none were found.

On Jan. 7th, 1916, both tonsils were enucleated. During the operation a considerable quantity of pus was squeezed from the right tonsil and a concealed abscess was found in the right from which several drops of pus escaped, the cavity being lined with a greyish yellow slough, examination of which microscopically gave a mixed culture of staphylococci and streptococci. Three days later the patient's pupils reacted to light and he could easily read Jaeger 1 at 12 inches without the assistance of any convex lenses. The removal of the tonsils was not only followed by immediate recovery from the paralysis of accommodation but also by a very rapid improvement in his general physical condition and the disappearance of his toxemia.

Note: The notes of another case of paralysis of accommodation due to a focal infection were given to me by Dr. T. B. Holloway of Philadelphia, but were not included in the above paper because in his case, instead of the paralysis of accommodation being due to chronic infection of the faucial tonsils it was due to a streptococic catgut infection.

THE SCISSOR MOVEMENT IN RETINOSCOPY.

BY

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"Scissor movement" is a form of irregular astigmatism and is of sufficiently frequent occurrence in retinoscopy to warrant further description and methods of handling such cases refractively than are given in our textbooks. In general terms, the shadow is split into two portions which, as the mirror is rotated, advance from opposite sides of the pupil and merge into one band giving the effect of closing a pair of scissors. On rotation of the mirror in the direction the reverse of that first employed the two oppositely moving reflexes again appear distinct and separate with a dark space intervening. Some uncertainty exists as to the cause of this phenomenon but it has probably been properly attributed, in general, to ectasia corneae and slight tilting of the lens. In this latter condition the anterior-posterior axis of the lens is not at right angles to the plane of the cornea. This tilted lens would cause one portion of the skiametric reflex to act myopically (light area moving against motion of plane mirror) and the other portion hyperopically. Scissor movement may therefore be due to coma on account of the obliquity of one or more surfaces of the dioptric media to the path of the incident light. This hypothesis is in part substantiated by the following facts: (1) in an eye having a normal reflex by direct illumination, the scissor movement may be obtained by directing the beam of light obliquely, (2) a tilted spherical lens, especially if of fairly high power, in front of an eye may produce such an effect, (3) the effect can be artificially produced with schematic eyes by the use of obliquely directed light and (4) by a combination of lenses, in bifocal form or character, giving for example an effect of -3.00 D. in upper portion and $+3.00$ D. in lower portion placed before a schematic eye set in emmetropic condition as described by

James Thorington, M.D., in the *Journal American Medical Association*, Dec., 1897.

Coma is aberration produced by the unequal refracting effects of different parts of the various meridians of the eye, or lens, on oblique pencils of light. It is, in brief, spherical aberration for oblique light: if this condition is produced optically we do not get a point image of a point object but rather a confusion disc which is non-symmetrical. In Figure 1 let L represent the crystalline lens in an oblique position. Assume that light has been thrown from the retinoscopic mirror into the eye; let A B represent the retinal area of illumination. The working distance lens is represented by W; for example, 1 D. for 1 meter. We are interested solely in the retinal reflexes or illumination returning to the observer assumed stationed at O. Let rays A N and B K be parallel rays of light emanating from the retinal area: the ray C M D E is the oblique principal axis. The ray B K reaches the sur-

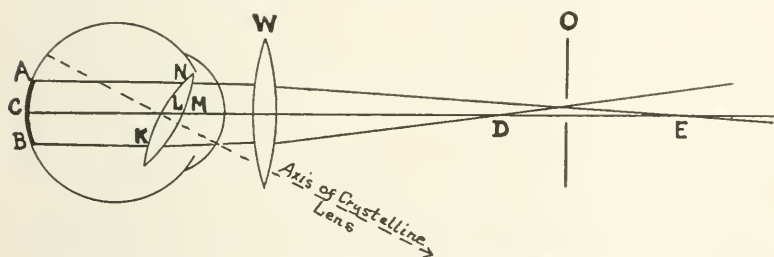


Figure 1. Showing Mechanism of Scissor Movement.

face of the lens sooner than the ray A N, and since B K departs more from minimum deviation than does A N (since the lens L may be considered as consisting of an infinite number of prisms) the emergent ray K D cuts the axial ray C E at D sooner or ahead of the emergent ray N E which cuts the axial ray at E. With the observer's eye at O we see from the diagram that it is possible (1) for the two reflexes, one myopic and one hyperopic, to be made to occupy one and the same position and (2) on motion of the mirror, since D is in front of the observer's nodal point and E is behind it, there will arise with and against movements or shadows.

Without doubt scissor motion may arise due to the obliquity of the light incident upon the eye under test. In the ordinary methods of procedure the patient is directed to look past the operator's ear and vaguely into space or at an illuminated test-

type. A much better procedure and one which eliminates quite frequently these scissor movements, which are in these cases false in the sense that they are due to physical rather than anatomical reasons, has been devised by Mr. John C. Eberhardt of Dayton, Ohio. Not only does this device do away with the liability to the above mentioned effects but it also insures the operator that the refraction at or near the macular area is being made retinoscopically which is a most important consideration. The device is diagrammatically shown in Figure 2. The macular reflectoscope is represented at D and consists of two parallel, plane mirrors, L and N, mounted on a suitable stand and so placed before the eye of the person being examined as to enable an illuminated 80 or 100 foot letter (B) at 20 feet to be seen or at least fixed upon by the eye A in its primary fixation position due to the double reflection of light by the mirrors L and N placed at an angle of about 45° with the line of sight. The operator O, with

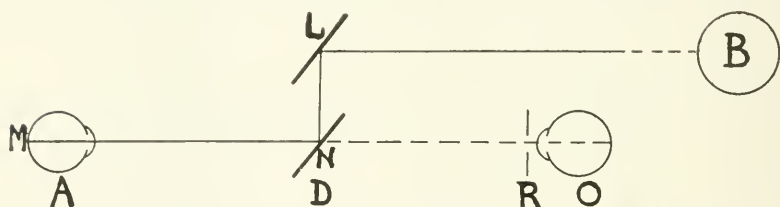


Figure 2. Diagram showing Method of Eliminating Scissor Movement.

retinoscope at R, may then proceed to the skiametric refraction of the eye in its *direct line of sight*.

Scissor movements which are genuine and which must be classed under the head of coma occur with fair frequency. A perusal of our text-books and treatises on refraction evidences the fact that but little if any information as to the methods of handling such cases is forthcoming. Jackson, in his monograph on *Skiascopy*, says:

"Its presence in the eye indicates obliquity or imperfect centering of one or more of the dioptric surfaces. Perhaps, because of such obliquity, this appearance of light and shadow in the pupil is apt to co-exist with a considerable degree of regular astigmatism, which on account of it, becomes more difficult to recognize and measure than it would otherwise be. Eyes presenting it, therefore, demand special attention on the part of the observer, to develop the best vision they are capable of with correcting lenses."

Laurance, in his *Visual Optics*, says:

"In an eye suffering from a considerable degree of irregularity or aberration, the application of retinoscopy with success is difficult if not impossible. In many cases, however, a considerable improvement in the action of the shadow may be obtained by the observer shifting his position from one side to the other in order to utilize the areas of least error."

Thorington, in his brochure on *Retinoscopy*, says:

"These cases are more or less difficult to refract, but the presence of the two areas of light with the dark interspace will often assist in a correct selection of glasses, for while they are generally of the compound hyperopic types, calling for a plus sphere and plus cylinder, yet practice and the patient's statement often call for a plus sphere and minus cylinder * * * The writer's method of procedure when he recognizes the scissor movement is to tilt the mirror until the two areas are brought into one band of light and then to reflect the light through the meridian of this band. Having obtained the lens which neutralizes the movement in this meridian, the writer does not attempt to find the neutralizing lens for the opposite meridian but goes from the dark room to the trial case and places before the patient's eye that sphere which corrects the refraction in the one meridian."

These statements are quoted at some length from these treatises because they contain about the only information available. For my own part, I have made a study of some fifty cases of scissor movement and shall present some few here, with diagrams, to illustrate the general methods of procedure and the determination of the proper cylinders to be prescribed. Above all it is important and essential that the retinoscopic refraction of such cases be made as nearly as possible in the direct line of sight; this is possible by the use of a device such as the so-called macular reflectoscope previously referred to or by dynamic skiametry. In this latter method fixation is elicited for a letter or set of letters or points on a card attached close to the mirror of the retinoscope; a neutralization skiascopically of one meridian by a sphere then leaves the opposite meridian to be corrected with cylinders, hence making it possible to determine the cylindrical element correctly irrespective of the operator's opinion as to the refractive accuracy of the spherical element found. When an eye is under complete cycloplegia these methods are still applicable although,

of course, the dynamic method is not dynamic but simply serves as a method of directing the patient's gaze; under cycloplegics the refraction in the line of sight can be accomplished very readily except for the disadvantage of peripheral rays which add to the already complicated problem. The general mode of procedure is, then, to neutralize the motion in the meridian opposite to that in which the scissor movement arises, keeping the two bands together as is advocated by Thorington. Having neutralized this meridian with spheres the writer then proceeds to the correction of the meridian in which the scissor movement has evidenced itself in the following manner: the two bands are brought together and the position of the line of union into a single band in the pupil is noted, i. e. whether, as it forms, it is the nasal, temporal, supra or infra side. The mirror is then rotated in the opposite direction slowly and the

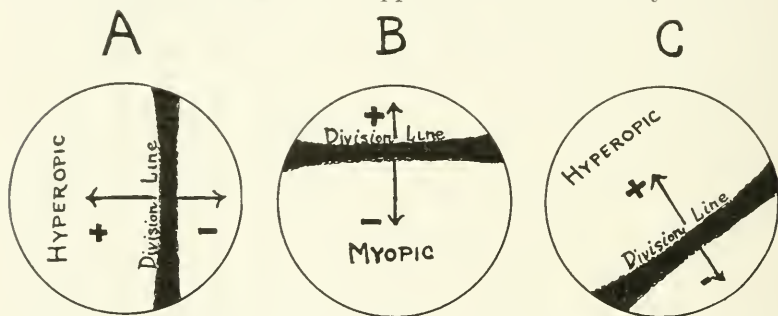


Figure 3. Showing Position of Scissor Bands.

positions of the two bands just at their line of separation are noted and *that portion of the double reflex which contains within itself the center of the pupil*, or which in any way gives evidence that it discloses the chiefly usable portion of the eye, is corrected with cylinders. In case of doubt as to which shadow to heed, since the line of demarcation may arise near the pupillary center, I have found it in general proper procedure to neutralize the nasal or the infra portions respectively. The greater percentage of cases show the scissor bands lying at or near the 180° line of the trial frame, but some few cases, particularly those giving a history of traumatism in the temporal region, exhibit these bands at or near the 90° point.

Case A. (See Figure 3 A.) O. D. -0.62 D. S. $\ominus -0.50$ cyl. ax. 90 ; V= $20/20$ O. S. -0.62 D. S. $\ominus +0.37$ cyl. ax. 90 ; V= $20/20$. Left eye exhibited scissor motion after the addition of -0.50 D. S. ($+1$ D. S. used throughout these

cases as the working distance lens.) It was found that -0.62 D. S. neutralized all motion in the vertical direction; in the horizontal direction the two bands united into one in the temporal quadrant; upon separation the hyperopic (with) reflex occupied three-fourths of the pupil; $+0.37$ cyl. ax. 90, in addition to the lenses used previously to neutralize the first meridian, corrected the with motion and -0.25 cyl. ax. 90 corrected the against movement occupying the temporal quadrant. With -0.62 D. S. $\ominus +0.37$ cyl. ax. 90 $V=10/10$ readily; with -0.62 D. S. $\ominus -0.25$ cyl. ax. 90 $V=7/10$ to $8/10$ with two errors; had been wearing for some years— 0.50 D. S. $\ominus -0.37$ cyl. ax. 90 and told the writer that the vision in this eye was not very good and never had been. Under oblique illumination, by the way, an operator would have been justified in concluding that the minus cylinder was demanded. The ophthalmometer showed no corneal irregularity; the clock-dial test elicited somewhat uncertain and changeable answers.

Case B. (See Figure 3B.) Right eye; division line above the center of the pupil; attention given to the lower portion only. A $+1.50$ D. S., working at one meter, gave neutral shadow in the horizontal meridian; in addition thereto -1.50 cyl. ax. 180 neutralized motion in lower portion of pupil. With $+0.50$ D. S. $\ominus -1.50$ cyl. ax. 180, $V=20/20$ to $20/16$. A $+1.00$ cyl. ax. 180 apparently neutralized the upper and hyperopic portion, but subjectively $+0.50$ D. S. $\ominus +1.00$ cyl. ax. 180 gave $V=10/20$ to $12/20$ with two errors.

Case C. (See Figure 3C.) Right eye; band forms and division occurs along the 30° line; the hyperopic or with portion constituted about three-fourths of the total reflex. A -1.50 D. S. neutralized motion along the 30° line or the line of the single band when the two were brought together. The upper, temporal portion of the scissors movement was neutralized with $+2.00$ cyl. ax. 30, the lower or against movement with a -1.50 cyl. ax. 30. The subjective tests showed that with -1.50 D. S. $\ominus +2.00$ cyl. ax. 30, $V=9/10$, while the minus-minus combination was absolutely impossible. The ophthalmometer showed a slightly irregular cornea; the amount of corneal astigmatic error did not exceed 0.75 D. as nearly as could be determined. This case, as well as Case A, gave a history of traumatism in childhood. This case was also clinically checked by use of a narrow stenopaic slit; the

best vision slit position was at 120° , the poorest vision slit position was at 30° . With the slit in the 120° position $+0.50$ sphere gave $V=10/10$ and with the slit at the 30° position -1.50 sphere gave $V=9/10$. This gives as the cylindrical corrections $+0.50$ cyl. ax. $30 \subset -1.50$ cyl. ax. 120 and as a sphero-cylinder -1.50 D. S. $\subset +2.00$ cyl. ax. 30 or $+0.50$ D. S. $\subset -2.00$ cyl. ax. 120° . In this instance, as in many others, it was discovered that one equivalent form was much more satisfactory to the patient than the other; why, the writer is unable to state except that the irregular astigmatic condition apparently demands that it be corrected *per se*; it is also to be noted that, in nearly all cases, the lens values needed to correct the two portions of the scissor motion are not equal. The satisfactory results to be obtained by the use of a narrow stenopaic slit in such cases, either in the initial or corroborative testings, is worthy of comment.

Case D. In the right eye, irrespective of the position of the eye, after the addition of $+2.25$ D. S. (allowance of 1 D. to be made for working distance) which neutralized one meridian, a scissor movement occurred with bands lying along the 45° line. By watching the position of the break of the single astigmatic band into its two parts it was found that the division occurred in the upper temporal quadrant; hence the nasal portion of the reflex, which was myopic in nature, was heeded and neutralized by the addition to the lens quantity already in the trial frame of -0.50 cyl. ax. 45 . The correctness of this procedure was checked by slightly overcorrecting the error, hence reversing the motion, in the 45° meridian by the addition of a small amount of plus sphere, when the scissor condition practically disappeared indicating only a minus cylinder with axis lying along the 45° line.

Case E. Right eye; without lens assistance $V=20/100$. With a -1.00 D. S. as the correcting sphere for the 180 meridian, a scissor movement developed in the meridian at right angles. Careful observation showed that the formation of the single band by bringing the two bands together and the line of separation on slowly rotating the mirror in the opposite direction was practically at the center of the pupil. Such a case as this is generally most troublesome; it is usually wisdom to correct the lower (or the nasal as the case may be) portion of the double movement. Retinoscopically the whole correction was determined as -1.00 D. S. $\subset -0.50$ cyl. ax.

180. Subjectively $-0.75 \subset -0.62$ cyl. ax. 180 gave $V=8/10$; a -1.00 D. S. gave $V=7/10$; a -1.25 D. S. $\subset +0.50$ cyl. ax. 180 gave V less than $8/10$ and greater than $6/10$. No improvement could be made over the first of the above prescriptions.

CONCLUSIONS: The chief points are briefly as follows:

(1) The desirability of and necessity for obtaining the retinoscopic findings as nearly as possible in the direct line of sight. Many scissor movements will not then evidence themselves although present under oblique examination.

(2) When a scissor movement arises, determine the position of the single band just as the two bands close together and again the position of the division line just as the two bands re-appear; correct retinoscopically by the addition of cylinders to the lens quantity already present the astigmatic band which contains within itself the center of the pupil or which gives evidence that it discloses the chiefly usable portion of the eye.

(3) In cases of doubt correct retinoscopically the nasal or the lower (infra) portion of the double reflex respectively and subject to rigid subjective testings.

(4) A slight overcorrection of the meridian first corrected may either do away with the scissor movement or aid in the determination of which portion thereof is to be corrected.

(5) The use of a narrow stenopaic slit in such cases is a valuable corroborative test.

KERATITIS ASSOCIATED WITH DENTAL CARIES— REPORT OF CASES.

BY

HENRY W. BLUM, M.D.

NEW ORLEANS, LA.

Although the literature is full of cases of eye diseases apparently caused by dental caries, the number of cases of keratitis is surprisingly small. I have been able after a pretty thorough search of ophthalmic literature to find only a very few such reports. Some of the reports referred to phlyctenular keratitis which were considered by the authors to have some relation to irritation arising from the oral cavity.

Most of us believe that oral sepsis is responsible for occasional disease elsewhere in the body, and suppurative processes in the mouth have been blamed for quite a number of

eye affections, from iritis to corneal disease. This paper does not deal with diseases of the eye caused by metastasis, but with keratitis produced by reflex disturbance produced by irritation of branches of the trigeminus. Asthenopia has been well recognized to be occasionally due to a carious tooth or to some other pathological condition existing in the dental apparatus which might by acting on the fifth nerve produce reflex disturbances in some other part supplied by the trifacial.

It has been asserted, and it has been contradicted, that there are trophic nerves in the cornea, but if we may judge from such cases as I present it does not seem unreasonable to assume that these corneal processes associated with dental irritation seem to be dependent upon trophic changes.

When Majendie observed in 1824 that section of the trigeminus of rabbits produced destructive lesions in the cornea, the trophic theory was evolved to explain the process. Wilbrand and Saenger concluded that neuropathic disturbances allied to herpes could be produced by irritation of the fifth nerve. Eberth, Bologh, Pano, and others contend that the entrance of the micro-organisms was due to the dessication of the corneal epithelium made possible by section of the trigeminus and consequent loss of sensibility. Roemer says that the fact that the Gasserian ganglion has been removed so often without lesion of the cornea is proof that trophic nerves do not exist in the cornea. Snellen pointed out that the sensibility of the cornea means a great deal so far as protection is concerned, and that when this sensibility is lessened that the cornea loses this great protection. Feur called attention to the dessication of the cornea and the liability of such eyes to invasion by micro-organisms.

It is a fact to be noted in reference to my cases that there was a marked loss of sensibility in the cornea, and that in the cases which I have seen months after the ulcers had healed that the anaesthesia was still present.

In *Recueil d'ophthalmologie*, Paris, 1878, 2sv324-336 Mengin gives cases of Dr. Galezowski of reflex accident due to lesions of the dental apparatus. He concludes that the lesions may be produced in several different ways: (1) By continuity of the tissues; (2) they may take the form of reflex accidents of the sensibility; (3) or of the motility; (4) one may encounter troubles of nutrition which may be dependent on disorders of the functions of the vaso-motors, that is, paralysis or

stimulation. "One knows, that the irritation of a nerve transmitted to a centre of reflection is susceptible to irradiation accidents, either in the phenomena of sensibility, or in the function of the vaso-motors." Mengin then proceeds to give a number of eye conditions which were relieved by attention to diseased teeth, in none of which was the cornea involved, however. I have quoted Mengin in support of the reflex theory of these neuropathic conditions because his views seemed to coincide with those of Galezowski who was a pioneer in this field. That the latter was a remarkably keen observer I believe that his studies in this direction will testify.

Terson in *Clin. Oph.* xvii p. 547 cites a case of corneal ulceration which was promptly relieved by extraction of an offending tooth. He gives this as an instance of a reflex by way of the fifth nerve. Leber in *Graefe-Saemisch* ii-2 mentions an observation of Samuel who saw a neuropathic keratitis follow an electrical irritation.

Marlow, in the *N. Y. Medical Journal* of April 14th, 1888, cites a case of ulcer of the cornea which apparently followed a blow on the eye from an umbrella. The ulcers of the cornea healed but the eye was not comfortable even after the process was apparently well. Three months later the patient returned with a severe iritis and a corneal haze. After three weeks' treatment several diseased teeth were removed and improvement began two days later, and the eye became entirely well in a short time.

Reber, in an article on the relation existing between the eyes and the teeth, mentions cases of Keyser, Brunswig, and Galezowski.

Jocqs case is referred to in the *Ophthalmic Year Book* of 1910, 152. In this case of dendritic keratitis a cure was effected three days after the removal of a carious tooth on the same side as the diseased eye.

Brunton in the *Transvaal Medical Journal* of July, 1908, reports two cases of ulcer of the cornea which he ascribed to the influence of decayed teeth.

Bruner, in the *Annals of Ophthalmology*, xxi Oct., page 744, and also in the *Ohio State Journal (Medical)* ix, 14 refers to diseases of the eye attributed to the teeth. He reports a case of ulcer of the cornea which was cured by the removal of badly placed crowns from several teeth.

Galezowski, in the *Revue General de Clinique et de Thera-*

peutique, Paris, 1898, 148-149, in speaking of the ulcers of the cornea which are produced by affections of the trigeminus said, "The ulcers of the cornea developed under the influence of very varied causes, but one of the most frequent is incontestably the alterations of one of the nerves of the trigeminus or one of its branches." He speaks of the experiments of Majendie on the section of the trigeminus in rabbits, the observations of Claude Bernard that the farther back of the Gasserian ganglion section was made the less there was to fear from destructive lesions of the cornea, and that injury to nutrition caused partial necrosis of the superficial layers of the cornea, and consequent ulceration. He also reviewed the exhaustive studies of Ranvier and Cohnheim on the nerve supply and nutrition of the cornea. Galezowski says, "These alterations occur as much by reason of the circumscribed paralytic anaesthesia of the cornea as by reason of the absence of the nutrition of this region. There results a neuroparalytic keratitis caused by an alteration of the fibres of the dental nerves; nothing can arrest this keratitis except the extraction of the decayed tooth."

In Jocqs article in *La Clinique Ophthalmologique*, Paris, 1909, xv, p. 23-27, after referring to the work of Schiff and Meisner on the trophic troubles produced by section of the trigeminus, says that irritation of the fibres of the fifth nerve may cause ulceration of the cornea, most frequently a reflex action by primary irritation of the sensory trophic fibres of the adjacent regions innervated by fibres emanating from the same nerve trunk (teeth, nasal fossae, sinuses). In many cases, as in reflex weeping (abnormal) and blepharospasm, there is a simple irritation transmitted to nerves physiologically associated.

Bousignario and Jocq report a case in which there was an exfoliation of the epithelium of the cornea. There were no painful teeth, but after five weeks' treatment two decayed and one loose tooth were removed. After three days blepharospasm and photophobia had disappeared and the cornea healed rapidly.

A. G. Fraser, in the *British Medical Journal* of September 16, 1905, mentions a case of dentition in an otherwise healthy child in which as each tooth was erupted there appeared a corneal ulcer which healed as soon as the tooth came through.

In the *Annals of Ophthalmology and Otology* Foucher

and Montreal report a case of herpes of the cornea in a man of fifty years associated with a decayed tooth.

In an article in *recueil de Ophthalmologie* of August, 1899, Galezowski again talks of the connection existing between the teeth and diseases of the cornea. He says that he has seen cases of keratitis which closely resembled interstitial keratitis, but he had been able to determine that they were neuropathic and due to carious teeth. He cautions us to determine the etiology of each case by careful search and that the analysis must be made scrupulously.

I wish to say that if I had not seen a case of this same interstitial variety that I would have been inclined to believe that despite the eminent and great ability of Galezowski, he was over enthusiastic and was allowing his interest to get the better of his judgment. Unfortunately, I can not add this case to my records because the patient did not attach as much importance as I did to dental hygiene, and failed to carry out my advice while he was under my care. The patient was a prominent attorney, and had been under the care of a colleague who had treated him for interstitial keratitis by the usual methods. When I saw him the first thing that struck me unusual was that a man of forty-five should have a parenchymatous keratitis. He had denied specific infection. Examination showed an extremely bad set of teeth, there being a number of carious teeth, some requiring extraction, and I urged him with all the eloquence of which I was capable to consult a dentist at once, not only for the sake of his eye but also for the benefit of his general health. In this case the corneal condition was exactly like the ordinary parenchymatous keratitis running a mild course.

Starting out with a knowledge of the relation existing between the cornea and the teeth in so far as the nerve supply is concerned, and remembering that the Gasserian ganglion sends branches to both structures, in the light of the frequent observations made of neuropathic lesions in the eye which were attributed to irritation in some part of the trigeminus, it does not require any great stretch of the imagination to conceive of these same neuropathic processes going on in the cornea and producing ulcers which are immediately caused to disappear by removal of the source of irritation.

I regret that I have only a few cases to report, but this paper will serve its purpose if it emphasizes the importance

of a thorough search for causes in this, as in all other diseases. There is confusion in the minds of some of us concerning corneal diseases, for we meet with conditions which seem difficult to classify and still more difficult to cure. The case of Galezowski which resembled the ordinary parenchymatous keratitis illustrates this fact, for a less careful observer would have failed to recognize the true condition.

The first of my cases of keratitis due to dental irritation occurred in the person of Mr. W. R. T. This man came to me in January, 1914, and had been previously treated by another practitioner for a period of three weeks. He presented three central corneal ulcers in the right eye. The patient attributed his trouble to the entrance of a foreign body, but because there were three ulcers I ignored this part of his story. The ulcers were sluggish and showed no tendency to heal. There was not much pain, but there was some photophobia. After I had seen this patient for a week and had treated him by the usual methods it suddenly occurred to me that this condition might have been a trophic ulcer and I began to look for a cause. In examining his mouth I found a number of carious teeth and the roots of others on both sides of his mouth. I argued earnestly that his defective teeth may have been responsible for his eye condition, and he was finally prevailed upon to have his mouth put in order. In three days the very bad teeth were extracted and a beginning was made of the long treatment required to make his mouth healthy. Improvement in his cornea was noticed three days after the removal of his bad teeth, and in four weeks the ulcers were healed over, and the eye was well. The reason for the long period between the extraction of the teeth and the final cure was that his teeth were so bad that the time required for the completion of the necessary attention to his mouth extended over a long time. At the time of his discharge the vision of the eye was 14/15 with correction.

I believe that the ulcers began as herpes and that this was the explanation of his idea of a foreign body.

The next case was J. B., a freight handler, who came to me at my clinic at Touro Infirmary. He, too, gave the history of a foreign body, and in his eye there were two central corneal ulcers, which were slightly branched, as in a dendriform ulcer. The cornea was anaesthetic and still remains so today, despite

the fact that two years have elapsed. He had been under the care of another physician at another of the free clinics for several weeks. There were found a number of carious teeth in the upper jaw of the same side, the right, and a history of necrosis of the lower maxilla three months before. Immediate extraction of the bad teeth caused his cornea to improve at once. Ten days after the attention to his teeth the ulcers were well. The only local treatment was atropine and castor oil. His vision today is 20/20.

R. F., a driver, came to me at Touro clinic for recurrent herpes of the lower cornea of the right eye. He was seen first in 1912 and was relieved after several weeks' treatment of the usual kind. He was seen the next year for another attack. He came again in the fall of 1914 for a third attack and it was noticed then that he had several carious teeth in the right upper jaw. The cornea was anaesthetic. One week after the extraction of the teeth his herpes was well, though there was no other treatment used but the local use of castor oil. This same patient came to me one year later with an iritis in the right eye following a chancre which he had had several months before. The cornea remained well though the anaesthesia persisted.

Miss G. came to Touro with a recurrent herpes of the lower part of the left cornea, which closely resembled the condition called by Verhoeff rosacea keratitis and which he attributes to a toxic disturbance of the terminals of the corneal nerves by way of the Gasserian ganglion. She possessed a number of carious teeth and there was associated a severe pyorrhea. She was persuaded to have several of her teeth removed but on account of her very bad health was afraid to have them all extracted. She was over-worked and under-fed. When I saw her last, six months later, she still had her teeth and her herpes.

The next patient was seen through the courtesy of another practitioner. The patient, Mr. P. of Alabama was seen in February of 1914 and showed a deep keratitis of the left eye. He had previously consulted two oculists, one a very prominent Philadelphia practitioner. I examined his mouth and found a bad molar of the left jaw and advised that attention be given to this at once. This advice was not followed. One year later I saw this man and was told that he had seen

an article in a lay journal which suggested to him the extraction of his bad tooth. He had followed this suggestion and the eye became well shortly after.

C. M. G. came to Touro Infirmary on April 17th, 1916, with a deep ulcer of the cornea of the left eye. The eye had been sore three weeks and when he came to us the ulcer was so deep that there seemed to be danger of perforation. The ulcer was three and a half mm. by six mm. and was near the temporal limbus. A pressure bandage was applied and he returned to the clinic on the 19th, when he was advised to have his second and third molar teeth of the left upper jaw, the second molar of the lower jaw of the right side and the third molar of the upper jaw extracted. This advice was followed, and healing was so far advanced five days later that I was able to remove the bandage. Healing was steady and continuous and when he was seen last, on the thirteenth of the next month, the cornea was entirely well. I believe firmly that if his mouth had been ignored in the treatment that he would have had a perforation and a badly damaged eye. The cornea was anaesthetic during the entire process and the eye was still insensitive when last seen.

W. H. J., a mail clerk, was seen on April 21st, 1916, for a deep keratitis of the right eye in the pupillary area. There was a deep infiltration of the cornea, manifested by a white point surrounded by an areola of lesser density. The epithelium of this area seemed at this time to be undisturbed though he gave the usual history of a foreign body. If I had found any disturbance of the superficial layers of the cornea at this time I would have believed that the trouble was due to traumatism because the whole picture looked like a small localized infection of the cornea, a small abscess, such as I have seen following penetrating wounds. There was not much inflammatory reaction, however, and the cornea was anaesthetic. Examination of his mouth revealed several carious teeth and after his bad teeth were removed and the necessary treatment given the other teeth his cornea began to improve. Previous to this dental care I had given him subconjunctival injections of saline solution, mercury and the iodides by mouth in the hope of stimulating the absorption of the infiltrate, hot applications and cauterization with the tincture of iodine, but the condition had remained unchanged. At the time of the dental attention there became manifest over the site of the

deep lesion several herpetic spots, and it was this which convinced me that the whole condition was neuropathic. After the attention to his teeth he was given four grain doses of chromium sulphate four times daily because I have found that this drug is useful in herpes of the cornea. The small herpes disappeared in a few days and the small point of deep infiltration gradually became absorbed. The opacity is becoming less dense from day to day and will no doubt eventually clear up entirely, though its location in the central cornea will make it a long process.

I have attempted to show that trophic ulcer of the cornea is not a rare condition, but one that occurs much more frequently than most of us believe. In speaking of ulcers of the cornea, de Schweinitz says, "The teeth should be examined, and if faulty, the patient turned over to a competent dentist. The frequent relation of carious teeth and pyorrhea alveolaris to corneal ulceration is well established, and the irritation of a new dentition in young children has been found to be the cause of abscess or ulcer of the cornea. In brief, the entire cephalic mucous membrane (Harrison Allen) should be explored, because, in one or other of its component parts, it may be the seat of disease, which, even if it is not the cause of the existing corneal ulceration, is none the less responsible for retardation in the healing process. Some corneal ulcers appear to have been caused by disease of the accessory sinuses, especially the ethmoid sinuses, and by purulent rhinitis."

In conclusion, I would like due credit given Miss L. Ambrose and Dr. F. A. Overbay for aid in the bibliography of this subject.

A NEW "MUSCLE SUBSTITUTION" OPERATION FOR CONGENITAL PALPEBRAL PTOSIS.*

BY

JOHN B. ROBERTS, M. D.,

PROFESSOR OF SURGERY IN THE PHILADELPHIA POLYCLINIC.

A Contribution from the Surgical Laboratory of the Philadelphia Polyclinic.

In November, 1914, a three-year-old girl was sent to me by Dr. H. A. Stout of Wenonah, N. J., for operative treatment of very marked double ptosis and a moderate degree of epicanthus of both eyes. The child had been taken previously

*Read at the meeting of the College of Physicians of Philadelphia on April 5, 1916.

to an ophthalmic hospital, but no operation had been performed. She had become very shy and sensitive because of the facial deformity and could not see very far in front of her unless she threw her head back to get vision through the narrow slit between the eyelids. From her sensitiveness it was almost impossible to obtain a satisfactory photograph, though I had repeated attempts made. She would not look at me or anybody else, but hid her face with her hands when one attempted to see her face. Indeed, I could get no proper opportunity to examine her eyes carefully until she had been etherized for operation.

My experience with operations for ptosis, admitted to be limited, has never been entirely satisfactory. Reading also has led me to believe that the experience of active ophthalmic operators has been often similarly unsatisfactory. I devised,



Figure 1.

Arabella S.— at 3 years of age.
Double congenital ptosis and slight
epicanthus.

therefore, an operation, which I had suggested in 1912,[†] based on the myoplastic methods which we surgeons use in traumatic and orthopedic muscular deficiencies.

It seemed, however, best to try at first one of the already recognized ophthalmic procedures. I, accordingly, operated on both eyes by the Wilder method.

The child could uncover the eyeball in the right eye after this operation so that about one-half the cornea was visible. The left eye was not so satisfactory in result, though the lid could be lifted better than before operation. The result of the operative treatment employed was encouraging, however, to the parents; and this year (1916) in March the little girl, being now about four years of age, was brought back to me for

[†]Surgery of Deformities of the Face, Wm. Wood & Co., New York, page 221.

further treatment. At the time of the first operation I had removed a vertical ellipse of skin from the front of the nasal bones to lessen the epicanthus, which deformed both eyes to a limited extent. Not much was gained by this operation, however.

I determined upon the present occasion to lessen the epicanthus by an arrow-head shape excision of skin and superficial fascia by Berger's operation, to get rid of the defor-

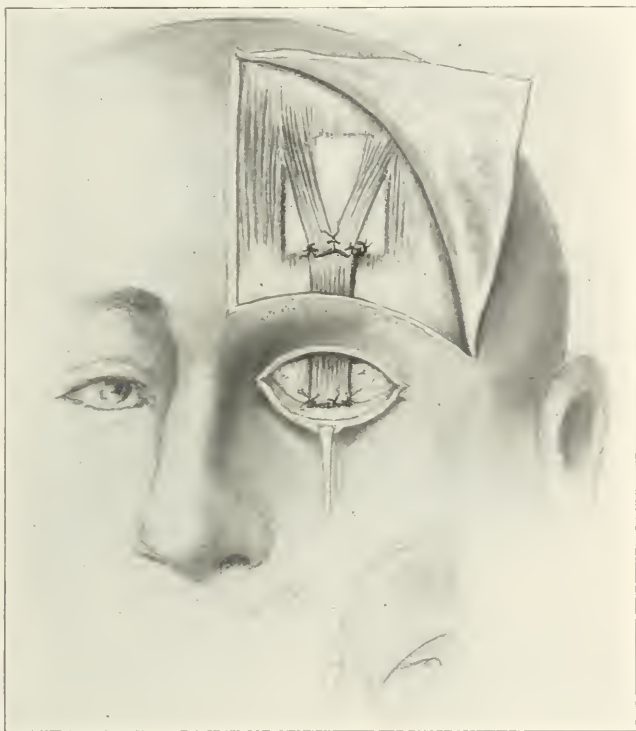


Figure 2.

Fig. 2. Diagram of Roberts's "muscle substitution" operation for congenital ptosis by transferring fibres of occipito-frontalis. Operation performed March 29, 1916, on Arabella S—. Small diagram shows method if flap turned downwards and outwards instead of upwards and inwards.

mity at the inner canthus of the eyes; and to try my previously devised muscle substitution method which I had employed only on the cadaver, though I had suggested it four years before, to relieve the ptosis of the left upper eyelid.

The left eyebrow was shaved and an incision carried from the root of the nose along the superciliary ridge almost to the

external angle of the frontal bone. From the nasal extremity of this cut a vertical incision was made through the tissues of the forehead almost to the hair line. The flap was turned upward and outward so as to expose the occipito-frontal muscle and tendon. Just beneath the upper orbital margin an incision down to the fascia of the upper lid was made from the nasal to the temporal side following the curve of the bone. This skin flap was turned downward, the tarsal plate exposed and its upper edge identified. A tunnel was then cut beneath the soft tissues about half an inch in width extending under the orbicular muscle to the incision made through the shaved eyebrow.

From the muscular belly of the occipito-frontal muscle



Figure 3.

Arabella S.—, 4-years. Photo shows effect on left eye of frontalis muscle substitution for congenital ptosis one month after operation.

immediately above the tunnel opening was cut a strip of muscular fibres about a third of an inch wide and an inch and a quarter long. The parallel incisions making this strip diverged a little at their upper ends so as to make the muscular band wider near its upper extremity. A cross incision was made at the upper end converting the muscular strip into a long flap.

This flap was turned downwards, thrust through the tunnel and attached to and upon the upper edge of the tarsal plate by three silk sutures. The two corner sutures were put in as mattress stitches and held the flap on top of, that is superficially to, the tarsal fibrous plate. Returning to the frontal region I cut on each side of the turned down flap two strips, each half the width of the inverted flap, having their only attachment to

the muscle above. These were drawn toward the fold of the inverted flap, attached to it on its superficial surface, which formally had been the under surface, by a mattress suture at each edge and were united in the middle line by a third suture, also put through the turned-over portion of flap so as to make a mattress suture. An additional suture was inserted at one edge where the first flap was bent over, to keep it thus folded. The superficial skin flap of the forehead was then replaced and sutured in position by worringut sutures. Subsequently the Berger operation with arrow-head excision on each side, was performed for the epicanthus. The sutures were so placed as to lift a little the inner canthus of each eye. The wounds all healed by



Figure 4.

Dr. Roberts's second case before operation. John K—, 8 years. Congenital ptosis with congenital palsy also of recti except the interni. One eye operated upon by same method as case in Figures 1 and 3. Not seen since about two weeks after operation. At that time swelling still existed.

first intention. A satisfactory result in addition to the child's ability to raise the eyelid has been that the operation makes a normal furrow in the lid at the seat of the upper edge of the tarsal plate. This is conspicuously absent in severe cases of congenital ptosis. The result at present is excellent, though the time since operation has only been about $2\frac{1}{2}$ months.

If the incision through the eyebrow to that at the middle line of the forehead for any reason seems undesirable, the flap can be turned outward and downward instead of outward and upward by making the horizontal incision within the hair line instead of in the eyebrow. It probably makes very little difference which incision is made, unless the superciliary one employed in this instance should interfere too much with the

branches of the supraorbital nerves and vessels. These will be less disturbed if the horizontal cut is made at the top of the forehead through the hair instead of at the bottom through the eyebrow.

When the *muscle* fibres of the frontalis are poorly developed in the forehead region, it may be necessary to carry the sagittal incision far upward into the scalp and thus uncover muscular structure beneath the scalp itself. I should be willing to go even beyond the coronal suture to obtain a thick mass of muscle for the three muscular bands. Transferring tendon alone in this manner will probably be futile in result.

TREPHINING IN BUPHTHALMOS. A DISAPPOINTMENT.

BY

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When I saw the admirable results of Elliot's trephining in chronic glaucoma I began at once to eagerly look for a case of buphthalmos to try it on. It seemed probable that trephining would solve the problem which had hitherto baffled all operators. On the one hand, the trephining promised to be free from the well-known dangers of iridectomy in the affection: while on the other, buphthalmos seemed to offer an ideal field for the operation, since on account of the great width of the limbus, the only serious difficulty of trephining, that of getting far enough into the cornea without button-holing or making the flap too thin, would be absent. Accordingly my disappointment was great when I got a poor result in each of the two cases of buphthalmos in which I have since done a trephining. One patient was a typical two-sided case in a boy of about five years. The other a one-sided case of moderate degree in a woman of about 35 years. In both the operation itself was as easy as possible, but the reaction was somewhat prolonged and final result, so far as improvement went, was nil. No distinct bleb formed and the tension and eye sight remained for the few weeks during which they were kept track of, as before the operation. Since then I have noticed that my experience is not unusual. Poor results from trephining in buphthalmos have been noted by a number of men who have been well satisfied with the operation in chronic glaucoma. I have noted such reports by Deutschmann,¹ Ask,² Bjerke,³ and Parker.⁴

Quackenboss⁵ speaks of having to abandon an attempt to trephine in buphthalmos on account of the extreme thinness of the sclera.

Axenfeld⁶ and Lundsgaard⁷ object to trephining in buphthalmos on entirely different grounds: the former because these patients being so frequently young, have so much longer and greater chance in the years of their life to have late infection: and the latter because the greater damage of traumatic injuries to the bleb which children are subject to.

If we grant that the results of trephining in buphthalmos are unusually poor, what explanation can be given of the fact? Those who believe in the inflammatory origin of buphthalmos may regard it as evidence of a tendency to plastic reaction by which the trephine hole is closed. It seems more probable to me that on account of the excessive enlargement of the globe, the conjunctiva, especially at the limbus, must be applied abnormally tightly to the globe, hence, when, after trephining, healing is complete, there must be unusual resistance to the formation of a bleb and an abnormal tendency for the conjunctiva to block the trephine hole. This suggests the probability that in buphthalmos it would be well, so far as the location of the trephine hole is concerned, to pursue a policy just opposite to that followed in normal cases. Since the attachment of the conjunctiva to the globe is looser at the posterior than at the anterior margin of the limbus, instead of putting the hole as far forward as the abnormally wide limbus will allow, one ought to put it as far back as possible and still keep the inner side of the hole within the chamber.

¹ Deutschmann, *Beiträge z. Aug.*, Heft 89, 680.

² Ask, *Klin. Monatsbl. f. Aug.*, Feb., 1915, 330.

³ Bjerke, *ibid.*, Sept.-Oct., 1915, 402.

⁴ Parker, *Abst. in Arch. f. Aug.*, 79, 333.

⁵ Axenfeld, *ibid.*, Feb., 1915, 266.

⁶ Lundsgaard, *ibid.*, Feb., 1915, 329.

⁷ Quackenboss, *Arch. of Oph.*, Nov., 1914, 601.

TUBULAR VISION: ITS UNDERLYING CAUSES.

BY

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By tubular vision I wish to be understood as meaning concentric contraction of the visual field, the result of organic fundus disease so that the person's sight may be likened unto one who is looking through a narrow tube of some length held

before either eye. Functional contraction of the field of vision as found in hysteria and traumatic neurosis is excluded. As illustrative of typical underlying causes, I will report the following cases:

Case A.—J. R. H., aet. 34 years: American born and a farmer living in Hamilton Co., Ill., first consulted me Sept. 5th, 1907, for inflammation of the eyes that has at times been better then worse during the past ten years. I found a shallow ulcer in the upper and inner corneal quadrant, right eye and chronic trachoma both eyes. Dec. 21st, 1908, there was an acute exacerbation of the trachoma in the left eye. Nov. 23rd, 1912, my refraction record is the following: O. D.: 15/40 improved to 15/20 with +0.50 cyl., ax. 180, O. S. 15/15. With either eye he read Sn D. 0.50. March 8th, 1913, he came complaining he saw poorly at night and continually bumped into objects. The dioptric media clear and the fundus without abnormal pigmentation. The visual fields taken on a perimeter with good daylight and test objects 15 millimeters in diameter disclosed concentric contraction on the temporal side right eye to 30 degrees, nasally and above and below to 25 degrees. The field in the left eye for form extended in a narrow tongue-shaped manner outwards to 70 degrees while above, below and inwards it reached 25 degrees. Blue, red and green were recognized with either eye in a radius of 10 degrees to 15 degrees around the fixation point: the circle for red being slightly less than for blue with green slightly more restricted than red. Dec. 4th, 1915, his last visit, he came near losing his life by bumping into a street car. Vision in the right eye 15/30, in the left eye 15/15. With +0.75 sphere he read Sn. D. 1.25 either eye. The field for form in the right eye extended in a circle around the fixation point from 10 degrees to 15 degrees; in the left eye from 15 degrees to 20 degrees. He recognized in this area in a somewhat smaller field blue, red and green. Ophthalmoscopically in the region of the equator the chorioidal intervacular stroma here and there, but without any uniformity of distribution was seen to possess a darker shading of pigment than other parts of the fundus. Pathological retinal pigmentation was not seen. The retinal arteries gave one the impression of being somewhat contracted. The optic disc was slightly discolored, being rather a dull gray. The lens and vitreous humor remained clear. The intraocular pressure was 17 mm. and the

brachial artery blood pressure 100. In his family history there is no record of blood relatives intermarrying and so far as he knows he is the only one that has poor vision. One aunt had orbital epithelioma for which I did exenteration and one brother has recently died of pulmonary tuberculosis. Syphilis he positively denies. Notwithstanding treatment, the loss of vision is slowly progressive. I hold the disease to be retinitis pigmentosa without retinal pigmentation.

Case B. Sophia K., widow aet. 64 years and living on a farm in Dubois Co., Ind., where she and her father and mother before her were born. She has no knowledge of blood relatives intermarrying in her family, nor does she know of any that were afflicted with poor eye sight or disease of the nervous system. At her first visit Sept. 8th, 1915, I obtained the following record: Sees poorly, especially in the evening so that she does not attempt to go about at night. Vision O. D. 15/80 Sn. D. 2.00, O. S. 15/120 Sn. D. 6.00. Improved O. D. +1.50 Sph. 15/15 and Sn. D. 0.50 with +4.50, O. S. +2.00 15/30 and Sn. D. 0.50 with +5.00. The visual field right eye showed concentric contraction to 20 degrees temporal side and to 10 degrees to 15 degrees above, below and nasal side. The left field was slightly more contracted ranging about the fixation point outwards 15 degrees, above, below and inward 5 degrees to 10 degrees. Within the retained form field either eye, she recognizes blue, red and green, test object 15 mm. in diameter; the green area being smaller than blue or red. The ophthalmoscope disclosed corkscrew blood vessels in the fundus both eyes and in the left eye outer side of the disc an interrupted blood vessel that ran horizontally outward a short distance, then disappeared and reappeared. In the equatorial region, left eye one or two black threadlike lines were found that gave off fine lateral twigs. Beyond these, the retina in both eyes was free from pathological pigmentation or blood extravasate. Her brachial blood pressure was 240 and the intraocular tension 18 mm. The urine contained neither albumin nor sugar and gave a specific gravity of 1021. Treatment: Diet restriction and iodide of potash. With this the circulation in the interrupted vessel left eye was re-established but the visual fields not enlarged. The nature and extent of the visual loss in these patients with the ophthalmoscopic appearances of the fundus points to lesion of the retinal perceptive elements. Anatomists divide the retinal layers into

three neurons and style them from without inward first, second and third: this in keeping with their conduction sense. The first neuron is represented by the rods and cones membrana limitans externa and the outer nuclear layer, and is termed by W. Müller (1) the sensory epithelium of the retina because of its function, the reception of light impressions. The second neuron is represented by the nerve cells of the inner nuclear layer while the third neuron embraces the ganglion cell layer. Besides a structural elementary difference the first neuron in contradistinction to the other two is without blood vessels, being dependent for its nutrition upon the chorioecapillaris. Whether in these cases the disease of the sensory epithelium is the primary one or secondary to disease of the blood vessels is not so clearly known. A. Wagenmann (2) in a contribution to our knowledge of the pathological anatomy of retinitis pigmentosa, says in a typical case which he had examined during life he found the following post mortem: The choroid was thickened through increase of its intravascular stroma and pigment accumulations. The walls of both the larger and smaller chorioidal blood vessels were sclerosed and thickened. Not only was the adventitia opaque but the endothelial lining of the intima had likewise undergone proliferation and he formed the impression that numerically the chorioidal vessels were diminished. His histological findings in the retina in the main agree with those of Leber as laid down in Graefes-Saemisch, Handbuch der Gesammten Augenheilkunde, the retina showing connective tissue proliferation, thickening and in places was adhered to the overlying choroid. In the supporting tissue of the retina cellular proliferation was especially noticeable with here and there hollow spaces containing an albuminoid substance. The rods and cones were wholly atrophic and supplanted by fibrous tissue. The retinal blood vessels were sclerosed and he found pigment not only in their walls but in the interior of connective tissue strings that represented wholly destroyed vessels. In general the retinal pigmentation was irregular but extended into the innermost retinal layers. The optic nerve fibre bundles were thin and atrophic while the interfascicular connective tissue was hypertrophied. It is his belief that the primary seat of the disease is in the chorioidal blood vessels and that the retinal changes are of a secondary nature and the result of nutritional disturbance. Opposed to Wagenmann we find F. O. Jewezki (3)

who states he found the inner retinal layers well preserved, while the internuclear layer, the external nuclear layer and the rods and cones had wholly disappeared. The limitans interna and the nerve fiber layer were unaltered. In the latter he observed blood vessels with thickened walls which in places had wholly obliterated the vessel's lumen so there remained only strands of connective tissue lying between which the remains of degenerated blood cells were seen. The vitreous bordering the retina was normal save for the same granular pigment that permeated all layers of the retina, especially along the blood vessels and the nerve fiber layer. The pigment epithelium was discolored with intercellular accumulations of granular pigment. The chorioid was not diseased, hence he concludes that retinitis pigmentosa is essentially a retinal disease, originating in perivascularitis of the retinal blood vessels. The nutritional and circulatory disturbances thus induced lead to the pigment changes. With this he is in accord with Landolt. At first it would seem that these diametrically opposite conceptions of the pathological histology of retinitis pigmentosa are irreconcilable. To me, however, they may both be correct since they agree that the initial lesion is one of the blood vessels. Pathologists recognize that arterial sclerosis may be general and again limited to certain regions with a predilection for involving the places where branches are given off or the vessels divide. As early as 1881 (4) in an experimental contribution to Bright's disease conducted on dogs and cats, I formulated the belief that noxious material circulating in the blood exerted harmful effect not alone on the adventitia but on the media and intima as well. According to Weichselbaum (5) the vessels first lose in elasticity and then undergo dilatation with slowing of the blood stream and lastly, through small cellular proliferation and the conversion of the cells into connective tissue the intima thickens. Later the thickened intima may undergo hyaline degeneration and appear homogeneous or instead take on fatty degeneration. In Case B, where the disease is connected with general arterial sclerosis, as evidenced by increased blood pressure and tortuosity of the fundus vessels, I have no doubt but what the chorioidal blood vessels as well as the retinal vessels are diseased and that the underlying pathological histology accords with that stated by Wagenmann. In Case A, on the contrary, where the blood pressure was low and the retinal vessels seemingly contracted, the pri-

mary lesion may be that as stated by Jewezki, of the retinal vessels which are end arteries with weakly developed muscular coat. Tubular vision is not alone found with retinitis pigmentosa, but likewise with diffuse chorioiditis, atrophy of the optic nerve and with certain cases of chronic glaucoma in association with disease of the chorioidal blood vessels. In advanced progressive atrophy of the optic nerve with a high degree of concentric contraction of the visual field, with the preservation of fairly good central vision we assume there remains a fairly good condition of the macular fibers. In certain cases of toxic neuritis, (malefern) with contraction of the blood vessels and atrophy of the retinal elements Uthoff (6) has found a high degree of concentric contraction of the visual field. A similar state may prevail in cranial deformity where we have an early neuritis and consecutive atrophy. Tubular vision when it occurs with optic nerve affections is not an early symptom but a late one and as a rule lacks the typical preservation of red and green color sense so characteristic of retinitis pigmentosa. According to Goldzieher (7) glaucoma in association with retinitis pigmentosa is exceedingly rare and besides his own case mentions three others. Since his report in 1897 some five or six additional cases have been placed on record: Be the primary lesion for the tubular vision in the chorioidal or retinal vessels, it is clear that the destruction of the sensory epithelium proceeds from the equator backwards towards the posterior pole of the eyeball. Roemer (8) would explain the cases of retinal disease without pigmentation upon the ground of an intact *membrana limitans externa*. So long as this remains intact the migration of pigment does not take place but as soon as this is destroyed the pigment invades the innermost layers of the retina. In proof of this, however, he adduces no histological support. Baas (9) attributes the retinal pigmentation to defective chorioidal nutrition and assumes that the pigment cells migrate along the retinal vessels because of the attraction of better nourishment. Since retinitis pigmentosa has been known to run through the final stage and terminate in blindness without perceptible fundus pigmentation at any time Roemer's explanation does not appeal to me and I would hold instead in these cases non-pigmentation rests upon the amount and quality of the pigment content of the epithelial cells. When this is small in amount in keeping with the complexion of the individual the cells may

undergo atrophy and decolorization without the pigment granules migrating into the retina. Retinitis pigmentosa has appeared in all ages of life. Aetiologically it is stated that consanguinity in the forebears plays an important role. If this be true the disease should be of rarer occurrence in the native American than in the continental European since intermarrying of blood relatives is positively forbidden by many of our states. In a personal communication from prominent ophthalmologists in ten of our largest cities they are in accord in stating it is their experience that retinitis pigmentosa has been met in the native born American about as frequently as in the foreign born. Schön (10) in seven cases of typical retinitis pigmentosa encountered rachitis four times and concludes that this is of aetiological moment. Gowers (11) thinks morbid states of the nervous system have some connection with its development while Roemer (12) and Hess incline to the belief that certain substances in the normal serum are able to destroy the elements of the retina by direct contact: these they term lysins. Such substances with power to dissolve the rods are separated from the sensitive elements of the retina in the living eye by the walls of the capillaries and the pigment epithelium. Hori (13) associates retinitis, changes in the intraocular vessels, tessellated intravascular spaces with liver disease accompanied by icterus. In this he is supported by Leber and Uthoff. Lastly as an aetiological factor I will add general arterial sclerosis as demonstrated in case B.

CONCLUSIONS: Tubular vision is a symptom that may be found in disease of the retinal perceptive layer, in diffuse chorioiditis, in progressive atrophy of the optic nerve and in chronic glaucoma following upon disease of the chorioidal vessels. Retinitis pigmentosa is oftenest its underlying cause. The latter affection is not an inflammation but more properly termed sclerosis of the retina since it represents degenerate change, the result of blood vessel disease in the chorioid and retina. In all cases the blood pressure and the intraocular tension should be carefully taken because of their aetiological value. If consanguinity is of the aetiological importance that is attributed to it in continental Europe, retinitis pigmentosa should be of infrequent occurrence in the native American born, since intermarriage is not only prohibited in many of our states but is of infrequent occurrence in this country.

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AN IMPROVED ELLIOT OPERATION FOR GLAUCOMA.

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While there may be some question as to the value of the Elliot operation as compared with other methods in the surgical treatment of Glaucoma, yet the splendid results reported in certain classes of cases, at least warrant the opinion that this operation has sufficient merit to commend it to further

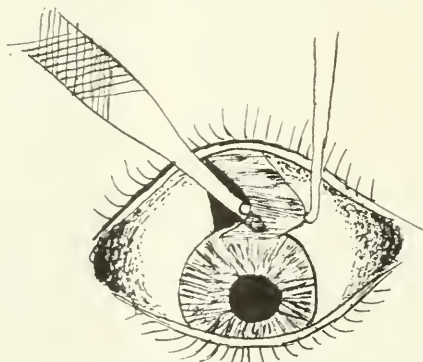


Fig. 1. Flap Raised on Hook and Trephine in Place.

consideration with the probable result that it will become a standard surgical procedure in certain well selected conditions.

It will probably undergo certain changes, modifications and improvements as our experience with it increases and

with this in view I submit the following contribution. After the usual preparation, cleansing and cocaine instillations, two parallel conjunctival incisions are made from the limbus extending upward for approximately $\frac{3}{8}$ of an inch. This is dissected away from the eye ball allowing both the upper end and the lower end to remain united as indicated in figure I, instead of cutting it away and forming the ordinary flap as described by Elliot.

The next step is to take a strabismus hook and inserting it underneath the bridging conjunctival flap near the limbus

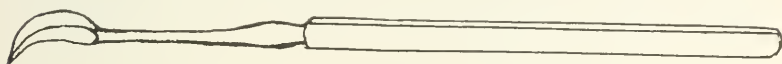


Fig. 2. Double Edged Corneal Dissector.

lift it away from the eye ball toward a point located a few inches in front of the center of the cornea and to one side. A specially designed knife is used to split the cornea as illustrated in figure II. In splitting the cornea special care must be exercised so as not to button-hole the flap.



New Elliot Operation Left. Iridectomy Right.

The flap is drawn over to one side and the trephine inserted slightly on a slant. The button is excised and the iridectomy is performed as indicated in the left eye of the photograph. The flap being attached both above and below requires no stitching. It is merely spread out with a spatula so that the edges coapt.

The photograph shows the result of an Elliot operation as modified by my method in the left eye, and the old standard form of iridectomy in the right eye. The advantage of a good

iridectomy in addition to just trephining the sclero-cornea is so manifest that it should never be omitted. The photograph shows a triangular iridectomy just above the left pupil with its base at the root of the iris. This, of course, is covered by the upper eyelid and does not affect the vision. In the case which is illustrated by the photograph we had an opportunity to compare the two operations and the results obtained in this patient are certainly in favor of the modified Elliot operation as described above.

The disadvantages of the operation are none except perhaps a slightly more difficult technique. This however is so slight as to be negligible.

Its advantages are:

- I. No suturing is required and therefore it takes less time.
- II. A flap that will positively stay in position and therefore a more rapid healing.
- III. No irritation due to the presence of sutures and consequently less post-operative congestion.
- IV. Since there is a more perfect placement of the flap, a rapid healing and an absence of all sutures there must be less danger from post-operative infection.

EXPLOSION OF SNELLEN EYES

If any of the readers of the Ophthalmic Record know of, or have had personal experience with cases in which there has been a spontaneous explosion of the Snellen improved artificial eye, the undersigned would be grateful to obtain accounts of the occurrences.

Two cases, happening recently in the practice of Dr. Casey Wood have brought this subject forward and it is proposed to investigate the phenomenon thoroughly.

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REPORTS OF SOCIETIES

CHICAGO OPHTHALMOLOGICAL SOCIETY.

DR. WILLIAM E. GAMBLE, PRESIDENT.

MARCH 20, 1916.

The Value of the Accurate Localization of Foreign Bodies in the Orbit.

Dr. C. C. Clement reported cases and emphasized the following points in recapitulation: Radiographic localization is the only accurate method of localization which we now possess. It is dependable when performed by competent men. It furnishes valuable information in determining whether or not the steel is within the globe. It gives information which we must possess before we can make an intelligent choice of operation for its removal. In case the corneal route is chosen, it modifies the Haab operation in such a way as to lessen the probability of doing violence to the lens. If the scleral route is chosen, it usually eliminates the necessity of introducing the tip of the magnet into the vitreous, an act which should always be avoided, if possible. From a medico-legal point of view, it furnishes a positive record of great value.

Injuries to the Eye From Broken Spectacle and Eye Glass Lenses.

Dr. Frederick B. Vreeland, after reviewing the literature very thoroughly, stated that the most significant conclusions to be drawn from the number of cases reported are:

1. That in proportion to the entire practice of 102 ophthalmologists, serious injuries to the ocular apparatus from broken lenses were very rare.

2. That rimless spectacles were worn in the greater percentage of injuries reported would indicate them to be less safe than other styles of glasses. This result is attributable to the fact that spectacles occupy a fixed position and the rimless lens is more easily shattered. In the case of nose glasses which are more easily knocked off the face, the chances of the eye being lacerated are less.

3. In most of the injuries reported the presence of minus lenses is noted. This is doubtless due to the fact that the centers of many minus lenses are not only so thin that they are often punctured by the ordinary force of cleaning, but also because they form a cutting edge, so to speak, with the sharp

edges immediately in front of the pupil. The opposite is true of convex lenses, as they afford a rounded surface, a greater degree of thickness of center, and altogether tend to deflect a flying object.

4. That glasses are a protective element rather than a menace is clearly shown by these reports, although the refraction has an important bearing upon that question.

5. It is well recognized that injuries do occur in which the glass no doubt adds to their severity because of its lacerating nature, but it is demonstrated that the advantages of glasses far outweigh this remote risk of added injury, and when you consider the nature of the force that usually causes these accidents, we can be reasonably sure that the eyeball would have suffered severe injury even though the glass had not been present.

6. That the eyeball can be severely injured in this form of trauma with comparatively small loss of function seems to be due to the aseptic properties of the glass.

7. The consensus of opinion that this accident occurs oftener in men than in women is perhaps due to the fact that men are exceptionally exposed to this kind of accident in various forms of industry and while taking part in various sports.

8. Some surgeons have expressed the belief that this kind of accident almost always occurs in industrial pursuits; the reports received, however, show that the injury is often a household accident, or a result of athletic games.

Dr. Willis O. Nance said that the localization of foreign bodies in the vitreous is one of great practical importance to every ophthalmologist. He asked as a matter of information, in what percentage of cases met with clinically did the foreign body lodge in the orbit. These cases are not very common.

Dr. Nance happened to be studying in Europe when the discovery of radiography was made. When he returned to Chicago he had a radiograph taken from the temporal side of a case of foreign body in the eye. It was one of the first of this character taken in Chicago, he thought. He reported the case with a cut of the radiograph in the Chicago Clinic. He was more and more impressed with the importance of having localizations passed upon by an expert radiographer. During the last few years he has in the main relied upon one radio-

grapher in Chicago to a very large extent—Dr. Potter, and has found his results very satisfactory.

After locating the foreign body, the question was how it should be removed, whether by the scleral route or through the cornea. This depends upon the point of entrance and to a great extent upon the size of the foreign body. It is usually a mistake to attempt to draw a large body through the eye. He had found by experience that the ultimate result secured in injuries of this kind depended upon the size of the foreign body. If the foreign body is small, the prognosis is usually good. He recalled the case of a man from a neighboring state who received a foreign body which passed through the cornea, through the lens and lodged in the vitreous. It was removed by the anterior route, and the patient recovered with 20/20 vision. The result was unusually good. He saw the man three or four years after the foreign body was removed and his vision was still 20/20. There was a very small opacity in the lens.

Referring to the care that one should take in preserving foreign bodies removed from the eye, especially if they are small, Dr. Nance stated that twelve years ago he removed a small foreign body from the vitreous of a man living in an adjoining state. He made a report of the case at this time to the parties who were interested and retained a copy of the record. Two or three months ago he received a letter from an attorney who was connected with the corporation for which the man worked, calling attention to the fact that the case had not been settled, and wanted to know if Dr. Nance could appear as a witness and, if possible, to bring the foreign body with him as evidence. When he looked for the particular specimen he was unable to find it. He had been in the habit of placing these specimens in small vials in which there was some cotton. He placed the foreign body next to the glass so that it could be readily seen, marked the specimen and put it away. When he opened the drawer that contained quite a number of specimens he found the vial supposed to contain this particular foreign body only a discoloration of the cotton. Evidently the foreign body through the process of oxidation had quite disappeared. He then looked over other specimens and found one in the same condition. He took out the cotton and instead of finding the foreign body found fine dust. Experience had taught him a better way of preserving these foreign bodies.

namely, placing the foreign body on a card and covering it with glue or some other similar substance to protect it from the air.

Dr. John R. Hoffman agreed with Dr. Nance that in cases of foreign bodies of large size in the eye we do not need to pay much attention to their location, and method of their removal, because their large size indicates the location, and the easiest route of removal; but for small bodies (steel or iron) from his experience of sixteen years with the use of the giant magnet, he believes that most of them go through the cornea and crystalline lens, which is opaque or beginning to opacify, when the patient presents himself.

The great majority of these foreign bodies can be removed through the corneal route by the classical operation of Haab without further damage to the lens and less injury to the structures in the posterior segment of the eyeball, the magnet here acting as a sideroscope and at the same time as the means of removal of the foreign body.

Occasionally cases present themselves in which there was no response to the giant magnet, because of the length of time elapsing between the injury and attempted removal, the foreign body having become encysted or imbedded in some other way making response to magnetism impossible and those cases are the cases that certainly call for localization.

A few days ago he saw such a case in which a piece of steel penetrated the eye through the upper border of the cornea through the lens, and on back into the posterior segment somewhere. He tried to remove it through the corneal route, but there was no response to the magnet. He then tried to locate it back of the ciliary body; but there was still no response. The patient was sent to Dr. Wells, who localized the foreign body at about the junction of the posterior and middle third 21 mm. back of the center of the cornea in the median line and sent Dr. Hoffman word that if he would cut down on it at that point he would get it. The eye was cocainized, but as a direct line would mean going through the superior rectus muscle the incision was made about 3 mm. to one side and a little anterior to the point of localization, thinking that the magnet surely would pull the steel into the wound. After several applications of the giant and hand magnet the attempt at removal had to be given up.

The patient was again sent to Dr. Wells who relocated the foreign body forward in the root of the ciliary body and still in the median line. The incision made the day before being within a few mm. of this location the tip of the large magnet was inserted under the sclera to the point of location, and the small chip of steel was extracted from the location (last) in which Dr. Wells said it was.

This case shows the value of localization of chips of steel in the eye where the magnet had failed in a previous operation in an injury where the cornea and lens had been penetrated, though the anterior chamber route was clearly indicated. He believes, however, that where the foreign body has entered back of the ciliary body, or when the foreign body had been in the eye for several days or longer, accurate localization should be done so as to indicate the shortest route for its removal.

Dr. George T. Jordan emphasized the value of localization by reporting the following case:

A boilermaker, while at work, had something fly into his eye, causing a severe wound. In less than two hours he saw the patient and by means of the giant magnet pulled a large piece of metal through the wound.

The case pursued the ordinary course and in due time was discharged, having light perception and projection. In about thirteen months the patient suddenly presented himself with a marked sympathetic ophthalmia. The offending eye was immediately removed with the surprising result that the sympathetic ophthalmia cleared up, which brought about doubt as to its being a true sympathetic ophthalmia.

The patient's general health was most thoroughly investigated by a competent internist and nothing was found which could cause the trouble.

When the eye, which was removed, was mounted, blocked and cut into, something was struck with the knife which was found to be a piece of rust broken off from the large portion of metal removed at the time of injury. This no doubt was the cause of the sympathetic ophthalmia.

Since that time Dr. Jordan has had radiographs taken, both before and after removal of foreign bodies from the eye.

Dr. William A. Fisher exhibited a beautiful drawing that Dr. Wells had made for him which showed a large foreign

body about one-half inch behind the external coats of the eye and there was no hope of getting it out. He could not understand how anyone could expect with the magnet placed in front of the eye to draw a foreign body up through the opening in the back part as the eye would change its position and prevent this foreign body from coming through.

He agreed with Dr. Hoffman that most foreign bodies go through the lens, and if the lens is injured the method of bringing the foreign body through the lens is best.

Sometime ago he reported to this society 150 cases of foreign bodies in the eye in which he took the position then that the magnet should be used first, and if one was not able to find the steel an X-ray should be taken. If it does not injure the lens and makes a large opening in the sclera, the proper thing to do is to put the magnet in the large opening and bring the object through the original opening or make the opening larger. In this case the foreign body has passed through the sclera on into the eye and out through the sclera into the tissues and cannot be removed unless the eye is removed. It is to be hoped the metal will be encapsulated.

Dr. Hal P. Wells discussed the subject from two standpoints, namely, the accuracy of present methods of localizing foreign bodies in the eye or orbit, and secondly, the limitations if any there be, of the X-ray in discovering certain substances which may be encountered in the arts and industries and which may be gotten into the eye.

First, the highly opaque metals including steel, iron, copper, brass, lead and certain non-metallic substances and metallic oxides such as crockery, stone, pyrites, anthracite coal, all of which may be considered practically of a class from the standpoint of opacity to the ray, in fact, they are all easily discovered.

Under the second group are considered less opaque substances such as certain varieties of glass, aluminum, soft coal, wood and a few other substances rarely encountered.

Dr. W. M. Sweet of Philadelphia has stated that any substance whose physical properties cause it to cast a shadow under the X-ray may be shown in the eye.

This statement the speaker thought required considerable qualification for it has been his own experience in working up the subject experimentally that the ability to show certain

foreign bodies on a photographic plate depends upon the immediate environment of the substance which it is attempted to show, and not upon the thickness or variety of tissues through which the ray must pass in reaching the sensitized plate; and as illustrative of this physical fact pertaining to the X-ray and certain substances the speaker mentioned his experimental work with bits of lead free glass. That is, glass containing no lead nor metallic oxides which would make them opaque.

In this experiment a very small particle of crown glass was cemented with collodion to the temporal region of a live subject so that by lying on the plate the eye of the subject came directly in line with the piece of glass and the ray from the focal point of the target of the X-ray tube. Under this condition the particle of glass was easily shown on all plates with varying exposure, and varying qualities of the X-ray light used.

The same particle of glass was then embedded in the vitreous of a sheep's eye which was then placed in the orbital cavity of a skull. Under these conditions the piece of glass cast no shadow on the photographic plate unless the particle of glass was large, that is, measuring at least a millimeter and a half in thickness by several millimeters in breadth and length. Small particles such as used in the first experiment being entirely lost.

The speaker mentioned that most of the glass used in the arts and industries, as well as much of the glass used for optical purposes, contained some ingredient making it possible for even small particles to cast distinct shadows on the dry plate, most of the flint glass used containing lead oxide, or barium or some other metallic oxide for the purpose of clearing or whitening the glass or to give it other desirable physical properties.

However, in spite of the difficulties attending certain of the substances which the speaker included in the second class, he believed that a further refined technic may still further eliminate the very few exceptions to the rule that, practically all foreign substances in the eye may be unmistakably demonstrated as to size, number and position. Illustrative of the finer differentiations which the modern technic has made possible a plate was exhibited showing a very small wooden splinter deeply embedded in the tissues of the hand.

With reference to the use of the giant magnet the speaker had seen many demonstrations of the unreliability of this instrument, both as a diagnostic and a therapeutic resource. He had seen a number of large pieces of steel in the eye which gave no reaction to the magnet and one case in which the foreign body consisted of tool steel and was about four and a half millimeters in length by three millimeters in breadth and an average of a millimeter in thickness, which was located at the equator of the eyeball, had made a large passage on entering the eye, and which gave no pain reaction whatever when the Haab magnet was applied. This particular case was referred to him with a negative diagnosis as to the presence of a foreign body, both the patient and the surgeon believing the wound in the cornea, iris and lens had been caused by a large body striking the eye and falling away without entering the globe, and the X-ray was resorted to merely as confirmatory of the negative diagnosis made with the magnet.

Dr. Wells then exhibited and demonstrated the Snook-Sweet apparatus for localizing foreign bodies and charting the localization in three dimensions.

He also showed a number of lantern slides and plates illustrative of his discussion.

Dr. C. C. Clement, in replying to the question of the percentage of the foreign bodies found in the orbit, said there was only seven per cent. in one series of cases reported. Statistics on this point would probably be inaccurate unless one excluded all of the cases that had not been localized by the Sweet method of localization or some other method equally accurate. He does not believe anyone can tell where a piece of steel is located by looking at the plate. Both Dr. Potter and Dr. Wells say they are unable to do so.

As to the choice of method of removing a piece of steel, he quoted Dr. Casey Wood as having written to 150 surgeons and eliciting their opinion as to which method they preferred. Of those replying, more than one-half of them preferred the scleral route, and the majority of them were located in the east. Accurate localization was generally practiced in the east before it was in the west, and the fact that eastern men preferred this route was significant.

In reply to Dr. Fisher's question, plates were shown to answer it. It was desirable to know the size of a foreign body

before attempting to extract it. One could not tell the size of it by the wound of entrance. The body might be long, round, or square. A foreign body could get into the eye through a surprisingly small opening.

Dr. Willis O. Nance stated that in 1907 he reported a case of ocular injury by a broken spectacle lens, and at that time looked up the literature very carefully and was unable to find any cases that had been reported previously. The case was fully reported in the first volume of the *Journal of Ophthalmology and Otolaryngology*. Dr. Worthington also reported a case before the society. The speaker was struck at that time with the rarity of injuries of this kind in clinical experience.

At the Eye and Ear Infirmary, at that time, after ten years experience in seeing many cases of ocular injury in that institution, this was the first case of injury by broken spectacle lens he had ever seen. Since then a number of cases had been reported. The late Dr. Beard had seen two or three such cases since this report was made. The speaker wondered if rimless glasses, both eyeglasses and spectacles, being worn much more commonly in the last eight or ten years, were not responsible for the number of more frequent occurrences of cases of this kind.

Dr. Fred W. Bailey, Cedar Rapids, Iowa, stated that in the last five or six years he had had four cases of injury to the eye-ball with broken spectacle lenses. The first occurred about six years ago, the patient being a young girl, eight years of age, whom he refracted and fitted for lenses. She had a slight degree of hyperopia and astigmatism plus, and two weeks afterwards she was brought back to him with the statement that a boy at school broke her glasses with a poker and injured the eye. She had a perforating wound of the cornea; three splinters of glass were taken out of the cornea, an iridectomy was done, and the child got along all right, with normal vision, with added astigmatic correction.

The next case was a man, 35 years of age, who wore rimless spectacles, and had a mild astigmatism. He was playing squash, the ball broke his glasses, cutting the sclera just outside of the external limbus of one of the eyes. This patient was sent to the University Hospital to have an X-ray examination made to see whether or not there was any foreign body

in the eye, but there was none. The eye healed and is as good as ever.

The next case was a young Englishman, 25 years of age, who, in playing ball, had his spectacles broken by his opponent. His glasses were rimless. He had 4° of myopia. The broken glass cut the cornea, which was followed by prolapse of the iris. An iridectomy was done, and the man recovered with two-thirds vision as compared with the other eye, but he did not know how much vision he had before the injury.

The fourth case was that of a professor in the university who, in adjusting the internal workings of his automobile, allowed a wrench to slip out of his hand, striking his eyeglasses, breaking the glass and cutting the cornea. He saw the patient within fifteen minutes after the injury. The iris was slightly caught in the wound. Under atropin the pupil was dilated, the eye attended to, and after three or four days in the hospital patient got along without any trouble. He had also myopic astigmatism.

Dr. Major H. Worthington stated that shortly after Dr. Nance reported his case in 1907 he had one of injury to the cornea from a broken spectacle lens caused by a tennis ball. At the time he reported this case, through the kindness of the late Dr. Beard, he included in his report the case he had under treatment at the Eye and Ear Infirmary, of a boy who, in entering a darkened room, ran into a bed-post breaking his spectacle lens and so badly lacerating his eye that after a few days it was necessary to enucleate the eye on account of sympathetic irritation having set in. The speaker had had since then two other cases of injury caused by broken spectacle lenses, one of superficial injury to the cornea, and the other with laceration of the skin of the lid. These cases all occurred in individuals wearing spectacles.

He believes that cases of injury to the skin of the lid and cheek from broken spectacle lenses are more common than injuries to the eyeball itself.

The Linear Method of Cataract Extraction; Cases Suitable for It and Its Advantages.

Dr. William H. Wilder read a paper on this subject in which he stated that the linear method of cataract extraction has a considerably wider field of application than is usually accorded to it. In the linear method of extraction the in-

cision is a straight one, and for making such an incision no instrument is as good as a lance-shaped knife, such as a keratome. The incision need not, in most cases suited for the operation, be a long one, but to insure that it be long enough a wide keratome should be used, so that the cut may be eight to ten millimeters in length, if it is thought necessary, and the length can be obtained with one thrust of the blade.

The advantages of such a straight keratome incision are self-evident. The coaptation of the lips of the wound is more exact than when the incision is made with a narrow-bladed knife with puncture, counter puncture and outward cut, and hence healing is more prompt. Again, with the short, straight incision the danger of gaping of the wound is less than with the long incision in the flap operation, and therefore the likelihood of postoperative complications is reduced.

Speaking broadly, this method is applicable for the extraction of any cataract that can be delivered through a straight cut in the cornea not longer than 10 or 12 millimeters. Of course, this precludes its use in senile cataract in which the nucleus is so large that it cannot be delivered through such a small opening. But up to the age of 35 or 40 years the nucleus of the lens is so small that it will readily escape through an opening of this size.

The author's own experience includes only one case of full-sized cataract in a person as old as 40 years treated by this method. In this connection, however, one should remember that the central portion of the lens becomes sclerosed at a younger period of life in some persons than in others, and given a case of 40 years one should be prepared to enlarge the incision, if necessary, which could be done with a suitable pair of scissors. Specifically then, the method is applicable in the extraction of all soft cataracts, i. e., those in which a nucleus has not yet formed or is so small that it will readily escape through an opening made by a linear incision, not larger than 10 millimeters. This will include lamellar cataracts, juvenile cortical cataracts and capsulo-lenticular cataracts in young subjects, as well as any other form of soft or cured complete cataracts in young adults under the age of 30 or 35 years, whether occurring spontaneously or as the result of injury.

The author then described traumatic cataract, shrunken

lenses, membranous cataracts, and described the technic in detail.

In summarizing the indications for and the advantages of this method, the author pointed out that it is the operation for extraction of soft cataracts in persons under the age of 35 years and even older. It is most satisfactory when preceded by a free dissection of the capsule. It is the operation for traumatic cataract in persons not older than 40 years. It is an excellent method of operating on intractable, thick membranous cataracts. The incision being comparatively short, straight and smoothly cut with a lance healed more quickly because of perfect coaptation and chance of infection is less. In many cases it is better to operate by this method for traumatic and needled cataracts than to wait for tedious absorption of lens substance and its attending changes.

DISCUSSION:

Dr. Thomas Faith said he could conceive of but two conditions of the eye in which he would attempt linear extraction, one was traumatic cataract, and the other was following needling in a juvenile cataract. If one could tell when the lens was soft and when it was not, the extraction of cataract would be much easier than it is, but one often can not tell when the lens is soft even by the age of the patient. A small incision was a great advantage in that it could be closed readily, but when one attempted to deliver a lens that had not been injured or disintegrated it was a temporizing measure. He had frequently employed linear extraction. Two days ago he resorted to it in a case of traumatic cataract of two weeks' standing. Through a linear incision and the use of a small curved director practically all matter was removed. He would not have the courage to attempt extraction of the complete lens at any age with the linear method. The extraction of capsular cataract was often accomplished by such an incision, but preferably by means of forceps. A keratome could be introduced and thrust through the capsule if it was not too tough. If it was too tough, it could be grasped with an ordinary iris forceps or straight forceps with a very fine shank, and either the entire capsule removed or a large rent made in it.

Dr. William A. Fisher asked Dr. Wilder what method he adopted in determining the kind of bacteria which

prevented him from operating, and whether he made smears or cultures.

Dr. George F. Suker said that, from a mechanical standpoint, it is more difficult to make an incision with a keratome than with a regular cataract knife; indeed, that is true of any angular knife. The line of incision is more under one's control with a straight than with an angular knife. It is exceedingly difficult to get a properly sharpened angular keratome and far less difficult to get a sharp cataract knife, both point and edge.

It has been his observation that a cataract knife is far safer in the majority of hands than an angular keratome. The puncture, counter puncture and cutting sweep of a cataract knife are easier to execute than the guiding and pressure-cutting of a keratome.

In his hands, the cataract knife is the knife of choice for opening the anterior chamber for any intraocular operation, be this opening for an iridectomy or cataract extraction.

It is not always an easy matter to determine the size of the nucleus, not only in the mature senile cataract, but much more so in the traumatic and juvenile types. We ought not to arbitrarily set any age for the size of a nucleus, no matter what type of cataract is considered, though it is understood that the nucleus of a juvenile or traumatic cataract is less solid than in a mature cataract.

Therefore, a larger corneal section is far better than one too small, which must be enlarged by scissors.

Dr. Wilder's remarks concerning the rapid management of juvenile and traumatic cataracts are in accordance with good surgical principles, and he has followed this self-same procedure for years in like cases. We ought not to be too hypercritical about getting non-serrated corneal incision in our cataract operations; certainly ragged incisions are to be deprecated. Even a keratome will give a serrated incision; to avoid serrations with a cataract knife, a long sweep and a persistent and accurate following up of the sweep will avoid serrations, i. e., the knife must not be allowed to lag, as it were, but once the cutting is started it is to be finished with as few strokes as possible.

When the iris is in contact with the cornea and the lens must be removed, there is no surgical contraindication for not

passing the cataract knife directly through the substance of the iris in making the corneal section. Though this is not a desirable condition to contend with, yet it is not an insurmountable one.

Dr. Wilder, in replying to Dr. Fisher, said the method he had always used was to make a smear, inoculate probably two tubes, use blood-agar, and then make cultures.

Keratitis Petrificans.

Dr. Harry S. Gradle reported a case of keratitis petrificans for Dr. H. B. Young and exhibited the patient.

Dr. George F. Suker reported the following cases:

1. A case of sella turcica decompression with remarkable results.

Mr. W., aged 58 years, in 1911 had intense basal headaches, associated with more or less vertigo, no nausea or vomiting. He had more or less mental symptoms, such as forgetfulness and lassitude, lack of concentration and irritability. His vision began to fail rather rapidly, and as he expressed it was unable to read "across the newspapers," only by shifting the page could he read the lines properly. Within six months or so, vision was reduced to faint light perception in the right eye and complete amaurosis in the left. About this time the left eye began to diverge some. The case was diagnosed as optic atrophy, secondary type. He remained in this condition until February, 1916, when he (through the courtesy of Dr. Crass) consulted me.

A complete physical examination (both laboratory and clinical) failed to reveal any lesion. He only had faint light perception in the right eye, limited to the papillo-macular area, no color perception, no Wernicke pupil, but individual pupillary reaction to light and accommodation.

An x-ray picture of the pituitary region, showed an enlarged sella with a very suspicious neighborhood (x-ray taken by Drs. Hartung and Hubeny). Upon the strength of the x-ray findings a transphenoidal sellar decompression, under local anesthesia, was made by Dr. Otto J. Stein, uneventful recovery.

Within twenty-four hours after decompression intense photophobia and lachrymation. Within forty-eight hours after, he began to recognize more light and had distinct form perception, counted fingers rather accurately at a few inches.

As yet, no color perception. Improvement only in right eye, left remained the same, amaurotic.

From now on improvement was rapid so that at the present time he can with a +5.00 in the right eye read at 14 inches 6/6 type; has almost complete color perception, and his field for form almost approaches the normal. He first began to recognize blue, then green and lastly red. He goes about unattended.

Each nerve head shows distinct evidences of having been choked, followed by a secondary optic neuritis, this in turn by an amount of atrophy.

No tumor mass or pituitary body was removed, but a large decompression was made. The decompression was only in the nature of an exploratory operation. A more radical operation is under contemplation. Further report later.

2. A case of multiple sclerosis with optic atrophy and ectopically placed leashes of opaque nerve fibers, in the same eye.

Mr. X., aged 50, a distinct case of multiple sclerosis, an optic atrophy in the left eye which can hardly be differentiated from a primary atrophy, showing that the nodules of sclerosis are situated almost at the entrance of the left nerve into the chiasm. In this same eye, towards the nasal side of the disc are two islands of opaque nerve fibers separated by an area of normal retina between themselves and the optic nerve. No opaque fibers at disc in any quadrant, vision 20/20. No improvement with any correction.

(This case is from the Cook County Hospital Service.)

PAUL GUILFORD,
Secretary.

OBITUARY

It is with great regret that we announce the death of Lyman Ware of Chicago, which occurred in that city June 1st, 1916. Dr. Ware was born in Granville, Illinois, Nov. 11, 1841. He was identified with ophthalmology in Chicago for more than forty-five years. He was connected with the Illinois Charitable Eye and Ear Infirmary from 1871 to 1889. He was Oculist and Aurist to the Presbyterian Hospital and the Chicago Orphan Asylum.

In the Civil War he saw service, amongst other battles, at Chicamauga and Lookout Mountain. Since the war he has been Medical Examiner (Eye and Ear) for the Federal Government in Chicago.

In 1880 Dr. Ware was one of the organizers of the Chicago Ophthalmological Society. In 1889 he was its Vice-president and in 1899 served as President of this society.



LYMAN WARE, 1841-1916.

CORRESPONDENCE

Columbus, O., April 6, '16.

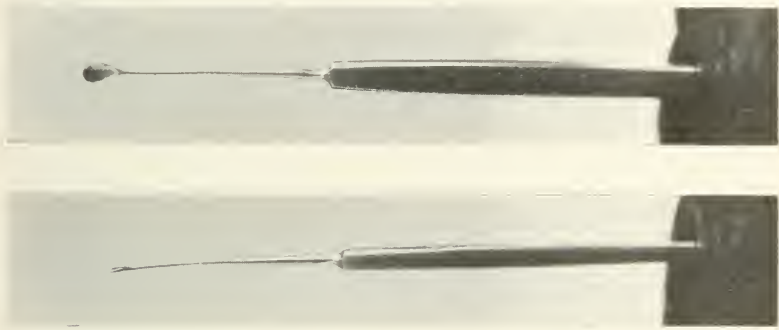
EDITOR OPHTHALMIC RECORD: Enclosed is an illustration consisting of two views of a cataract spoon.

Number one shows the paper-like thinness of the spoon.

Number two gives an idea of its concavity and lateral dimensions (actual size).

The spoon is intended for soft cataract extraction with keratome incision and is frequently of use in ordinary cataract extraction.

Its advantages over larger and thicker spoons are that it



Clark's New Cataract Spoon.

may be introduced into the eye with the least tension on the incision edges.

The photograph gives the actual size of this new spoon which is different from any other in the catalogues; this instrument is much more delicate than Worrel's, Schmidt-Rimpler's, or Critchett's.

I mention the above so that others in search of an instrument less cumbersome than those in common use may have one without giving a special order for its construction as I was forced to do. The instrument was made for me by F. A. Hardy & Co., Chicago, Illinois. IVOR G. CLARK.

Experiments by Prof. John G. Sinclair at the University of Chicago show the hereditary factor in colorblindness in the fruit fly as it is known to exist in the human.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. S. Lewis Ziegler of Philadelphia has been elected trustee of Bucknell University.

Dr. Henry L. Picard has resigned after 20 years service on the staff of the Wills Eye Hospital, Philadelphia.

Dr. C. A. Veasey is president of the Pacific Coast Oto-Ophthalmic society which meets in Spokane next June.

Dr. L. Webster Fox is a member of the board of trustees of the Pennsylvania Military Academy at Chester.

Dr. Samuel Z. Shope has been given the degree of L.L.D. by the Lebanon Valley College, Pennsylvania.

Dr. G. E. deSchweinitz of Philadelphia is oculist of the hospital unit of the U. of Pa., which has offered to serve with the Red Cross in the U. S. Army.

Dr. I. J. Magee, late interne at the Illinois Charitable Eye and Ear Infirmary, has located in Chicago where he is associated in practice with Dr. C. D. Wescott.

Dr. Derrick T. Vail of Cincinnati, is spending the summer at his cottage in Waukazoo, Mich.

Dr. J. Santos Fernandes of Havana, is the representative of the Ophthalmic Record in Cuba.

The Oxford Ophthalmological Congress was held at Keble College, Oxford, on July 13 and 14. The main discussion was on the subject: the relationship of ophthalmology to general medicine. Sir William Osler and Sir Anderson Crichtett led the discussion.

Drs. Leo Wolfenstein and Roy B. Metz have been made instructors in ophthalmology in the Western Reserve University.

Dr. Percival J. Hay has been appointed ophthalmic surgeon to the Sheffield Royal Hospital, England, succeeding the late Stanley Riseley.

Mr. A. L. Whitehead is ophthalmic surgeon to the Union Infirmary, Leeds, England.

Lieut.-Col. Henry Smith of Amritsar, India, has been appointed consulting ophthalmic surgeon to the British forces in Mesopotamia.

An important report has been issued by the National Board of Medical Examiners. This board is an unofficial body which hopes, by means of uniformly high grade examinations, to obtain recognition from state medical examining boards so that eventually the examination taken in Washington will suffice to admit a candidate to licensure throughout the U. S. and its dependencies. Information can be obtained from Dr. J. S. Rodman, 2106 Walnut St., Philadelphia.

THE PUBLISHER OF THE OPHTHALMIC RECORD HAS BEEN NOTIFIED THAT FRAUDULENT AGENTS ARE SOLICITING SUBSCRIPTIONS TO THE RECORD. SOMETIMES THEY REPRESENT THEMSELVES AS STUDENTS EARNING A SCHOLARSHIP. WE WOULD WARN ALL PHYSICIANS AGAINST PAYING THEIR SUBSCRIPTIONS THROUGH ANY EXCEPT RESPONSIBLE, WELL ESTABLISHED AGENCIES.

WANTED—Association or assistantship with Eye, Ear, Nose and Throat Specialist by a woman physician. Have had three years experience in specialty; general internship; resident house physician two years. Desire position which eventually will become permanent. Prefer Chicago, but will accept position elsewhere. Answer care of OPHTHALMIC RECORD.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.) A. G. Wippert (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wippert (E.E.N.T.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.) J. A. Cavatone (E. N. T.) A. G. Wippert (E.E.N.T.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippert (E.E.N.T.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A.M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.) Harry Gradle (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Kemmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) C. W. Ess (Inf.) E. R. Cressley (Inf.) M. Goldenberg (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M. W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) F. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Kemmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) C. W. Ess (Inf.) E. R. Cressley (Inf.) M. Goldenberg (Inf.) C. C. Clement (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (E. N. T.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) F. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Kemmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Ess (Inf.) E. R. Cressley (Inf.) M. Goldenberg (Inf.) C. C. Clement (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) Oliver Tydings (E. E. N. T.)	W. Allen Barr (Inf.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. Duncan

*Special operative eye clinic.

ABBREVIATIONS:

County: Cook County Hospital, W. Harrison and Honor Streets.
Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.
M. H.: Mercy Hospital.

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.
E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.
P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.
N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.
St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.
U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE OPHTHALMIC RECORD

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THE EYE, EAR, NOSE AND THROAT IN DISEASES OF THE THYROID AND THYMUS.*

BY

HANS LISSER, A.B., M.D., 516 Sutter St.

SAN FRANCISCO.

"It was perhaps in 1849 that the first experimental proof was brought of the action which a ductless gland might exercise upon the organism. Berthold, professor in Göttingen, transplanted the testicles of young cocks and noted that the birds so treated developed the masculine voice, sexual desire, and love of combat. He thus in considerable measure anticipated Brown-Séquard, to whom the doctrine of internal secretions is generally accredited, and who, twenty years after Berthold, committed himself to the view that a gland, whether possessed of ducts or not, elaborated substances which were essential to the growth and maintenance of the body and for the preservation of health. It was a memorable meeting in Paris, at which, two decades after his first pronouncement, this super-gifted man related in support of his views the results of experiments made upon himself. He testified, that following the injection of testicular juice he observed an astonishing revivification of his physical and mental powers." (Halsted.)

In the succeeding twenty years, an enormous mass of experimental and clinical observation has resulted in the unraveling of many remarkable symptom complexes, which we have come to associate with abnormality of one or more of the endocrine organs. The thyroid gland especially, has been subjected to intensive study, and has interested some of the most brilliant minds in medicine, surgery, physiology and pathology—and yet its best known disorder, Basedow's disease, is far from being entirely understood. Indeed, it is now seriously questioned whether the Thyroid is ever, alone, responsible for this symptom complex; whether in some cases moreover, it is, perhaps, acting only in a subordinate capacity.

*Read before the San Francisco County Medical Society, May 23, 1916.

It is the purpose of this paper to briefly summarize those signs and symptoms occurring in the eye, ear, nose and throat, which are helpful to the clinician in arriving at a diagnosis of Thyroid or Thymus disease. This procedure necessarily decapitates, as it were, the clinical picture, for as you know, many of the most important disturbances are located below the larynx, in the internal viscera and in the extremities.

Hypothyroidism.

Hypothyroidism signifies insufficient function of the Thyroid gland, and when this condition occurs in childhood, before maturity, it is called Cretinism, and the intensity of its signs and symptoms will depend partly on the degree of Thyroid insufficiency and partly upon the age of onset. Cretinism is itself divided into Endemic and Sporadic Cretinism; the former referring to those cases that occur in certain parts of the world, like Switzerland, where the disease is endemic and where the cause of Thyroid insufficiency is supposed to be related to certain peculiarities in the drinking water.

Endemic Cretinism.

In this condition the eyes are far apart. Conjunctivitis is not uncommon, and as a consequence, eczema of the lid margins. Hirschmann thinks this conjunctivitis arises through disturbance in the outflow of tears, as a result of the saddle nose. Ottolenghi found the visual fields narrowed outward and above. The fundi are normal in most cases; in a few cases, Hirschmann has described "inferior crescents," but apparently not related to the cretinism. Dentition is retarded; the tongue is thick, and the nose is broad and saddle shaped; (not every saddle nose is due to congenital syphilis).

It is an extraordinary fact that in those same regions where cretinism is endemic, there also, deaf-mutes abound in astonishing proportions. St. Lager reports 5,000 Cretins in Switzerland, and 4,000 deaf-mutes, and 80 per cent of the latter were Cretins. Scholz found that 29 per cent of Cretins were deaf-mutes and 32 per cent additional, hard of hearing. The intensity of the deafness does not always run parallel, however, with the other cretin symptoms. Hammerschlag, who was one of the first to carefully investigate this condition, sometimes found changes in the peripheral ear, and again disturbances in bone conduction. Incomplete ossification of the stapes; impaired development of the epithelial cells in the ductus cochlearis; shortening of the base of the skull and thus dis-

turbance in the development of the ear; anomalies of the hammer; myxoedematous swelling of the mucous membrane of the middle ear, etc., have been advanced as etiological factors. Probably degeneration of the cortical centers, and lack of normal development of these centers due to Thyroid insufficiency, is also partly responsible.

Sporadic Cretinism.

Myxoedematous swellings of the eyelids occur in this condition. It is also an interesting fact that the mydriatic effect of homatropin remains an unusually long time. The whole facial expression is characteristic—low hair line, giving the aspect of an animal, drawing in of the root of the nose, thick lips and a projection of the thickened tongue. The tonsils are enlarged and there are usually adenoid growths, so that the children snuffle and snore. There is a constant secretion from the nose a rhinitis hypertrophicans.

Disturbances in hearing also occur, and are distinguished from the endemic variety by the rapid spectacular improvement which takes place through Thyroid feeding. Endemic cretins are but little influenced by Thyroid Therapy.

Wagner thought the impairments in hearing were due to myxoedematous swellings of the mucous membrane of the Eustachian Tube and middle ear. Denker, however, in Thyroidectomized dogs who became entirely deaf after operation, found no histologic changes of a myxoedematous character, nor for that matter any degenerative change in the peripheral or bulbar centers. The question remains unsettled; otologists think that central auditory perception is disturbed; Heller considered it a psychical deafness. Gretzmann thinks it a defect in attention and a high grade weakness in the auditory memory. Sporadic cretins are not as a rule deaf-mutes, though some impairment in speech development frequently occurs.

Cachexia Thyreopriva Adultorum or Myxoedema.

This signifies an insufficiency of thyroid function occurring in the fully developed adult. These patients present myxoedematous swellings of the skin with predilection for the eyelids, cheeks, nose, hands and feet and supraclavicular fossæ. The swollen eyelids are responsible for a narrow palpebral aperture, resulting in a facial expression at once sleepy and stupid. The eyebrows are thin and fall out to a large extent. Here again, instillation of homatropin produces a mydriasis

of abnormally long duration, 36 to 48 hours; indicating that the autonomic system is more readily depressed than normal.

In the adults likewise, in 50 per cent of cases, myxoedematous swelling of the Eustachian tube causes impairment of hearing, which responds promptly to Thyroid Therapy. The nose and lips are of a blue red color; the mucous membrane of the mouth is of a whitish color; the uvula and tonsils are swollen, hindering nasal breathing. The tongue is thick, so that it can be seen between the rows of teeth and shows on its sides the imprints of the teeth. The teeth become carious and fall out. The mucous membrane of the larynx becomes thickened and produces raw voice changes, and according to Magnus-Levy, singing is impossible.

Malignant Uveitis and Interstitial Keratitis.

At this juncture it may be appropriate to mention some suggestive observations of Bordley of Baltimore and Risley of Philadelphia. The former reports five cases of malignant uveitis, characterized by photophobia, tender eyes, loss of visual acuity, exudates on the post-corneal surface progressing into a vitreous cloud that filled the chamber and obscured the retina and ultimately ended in blindness. These cases had run the gamut of all recognized therapy—mercury, salvarsan, iodides, pilocarpin and sweat baths, diet, tuberculin, subconjunctival injections of sodium chlorid and bichlorid—all of which remedies failed. In these cases administration of thyroid gland tablets produced most striking and remarkable results. Bordley acknowledges that this relationship between hypothyroidism and uveitis was previously noted by Demets. He does not wish it inferred that malignant uveitis is necessarily a symptom of cretinism or myxædema, but thinks it is a severe infection, the body lacking power to overcome it, and feels that perhaps the thyroid rejuvenates metabolism and consequent tissue regeneration. In this connection Risley makes the interesting statement that interstitial keratitis is not always luetic in origin, but is the result of impaired nutrition, the latter resulting also in weakened function of the thyroid and inability on the part of the thyroid to maintain general nutrition. He found that administration of thyroid substance rapidly improved these cases, which had previously resisted the most intensive anti-luetic therapy. These observations are not conclusive, but are highly enlightening and deserve consideration.

Hyperthyroidism—Basedow's or Grave's Disease.

In contradistinction to hypothyroidism, the ears, nose and throat are not, so far as I am aware, seriously affected in hyper or over function of the thyroid gland. Occasionally a dry scratching in the throat and hollowness of voice tones has been observed, but that is all. The eyes, however, more than compensate in the variety and multiplicity of signs and symptoms.

The Von Graefe phenomenon—failure of the upper eyelid to follow the eyeball downward—is assumed to be due to an increased tonus of the levator palpebrarum.

Dalrymple's sign—retraction of the upper lid on straightforward vision, resulting in a widened palpebral aperture, is due to abnormal tonus of the oculomotor nerve, and is probably to be regarded as a sign of autonomic irritation.

Infrequent, incomplete, involuntary winking, described first by Stellwag, is quite striking; whereas, normally three to five winks occur per minute, winking may be absent for several minutes.

Moebius' sign, not very common, refers to an inability to hold the eyes in convergence and is ascribed by some to a fatty degeneration of the eye muscles.

Gifford noted the difficulty in everting the upper lids and Joffroy called attention to the failure of the forehead to wrinkle on looking up.

There may be overflow of tears or abnormal dryness of the eyes, the former supposedly an evidence of vagotonic preponderance, the latter of sympathetico-tonic influence.

Tremor of the eyeball has been mentioned and Kocher described the subjective pressure feeling behind the eyes. Jellinek and Rosin noticed frequently a pigmentation of the upper lid.

Finally, and perhaps most striking of all, is the protrusio bulbi, or exophthalmos, which has given to the disease the well known name of exophthalmic goitre. There have been several explanations for this important phenomenon. Increased filling of the orbital vessels has been held responsible and this is supported by the rapid changes in degree of exophthalmos at different times. Claude Bernard reproduced the condition experimentally by electrical stimulation of the sympathetic trunk in the neck.

Perhaps the most widely discussed theory is that of Landström who claimed that the protrusio bulbi was due to an abnormal tonus of the sympathetically innervated Müller-Landström muscle. Troell has advanced several objections to this contention. He insists that the muscle is weak and so asymmetrically placed as to be hardly capable of producing alone the pronounced exophthalmos that frequently occurs. In fact he believes that the contraction of the muscle would pull the anterior portion of the eyeball back, rather than the posterior portion forward, as the latter is the more fixed point. Furthermore, in ten per cent. of the cases the exophthalmos is unilateral. In these cases one would have to assume that the sympathetic on one side alone had been intoxicated by poisonous decomposition products, disseminated from the thyroid gland by the general circulation. Again it would be difficult to explain the absence of pupillary signs, if the sympathetic stimulation is due to the pressure of the enlarged thyroid.

It is also interesting to note that epinephrin and cocain are sympathetico-tonic substances of high degree, yet subconjunctival injection of these drugs at a point near the Landström muscle does not produce exophthalmos, but does produce striking widening both in the pupil and in the lid cleft. Hesser skillfully avoids these criticisms by suggesting that the exophthalmic goitre toxin may have a selective action on certain nerve fibers, drawing attention to the significant fact that amyl nitrite effects those vagus fibers that supply the heart, but not those that proceed to the digestive tract.

Troell reasoned that if he could produce exophthalmos experimentally by the use of toxic materials—and then excise the sympathetic on *one* side and still produce the exophthalmos on *both* sides—that he would have proved that the sympathetic is not necessary to the production of exophthalmos. He accomplished this by the subcutaneous injection of paraphenylenediamin hydrochlorid, producing protrusio bulborum without the intermediation of the cervical sympathetic. He considered the experimental exophthalmos as due to edema of the contents of the orbit, but does not deduce that in man the same explanation necessarily follows.

Thymus.

Turning now to the thymus, it may well be asked why this organ should be considered in relation to the eye, ear,

nose and throat. A casual survey of the literature affords no direct discussion of this question. And yet recent work of extraordinary interest suggests very strongly the probability of quite a definite association between thymus disorders and at least certain eye signs. The subject must be approached indirectly by considering the significance of the thymus in Basedow's Disease.

In 1895, Von Mikulicz called attention to the presence of enlarged thymus in certain severe cases of exophthalmic goitre. Rehn in 1899 suggested surgical attack of the thymus in these cases, and Garré in 1911 found that in 95% of fatal Basedow cases there was a "thymus persistens hyperplastica" and he was the first to do a pure thymectomy for a case of Grave's disease. Some astonishing results have followed and the thymus-eye relationship is illustrated by the following cases:

Halsted, a very careful and reliable observer, reports a patient who presented extreme exophthalmos and all the eye signs of advanced Basedow's disease. He performed ligation of the thyroid arteries, two at a time, and later a resection of both lobes of the thyroid. A year later she returned improved as regards her general symptoms, but the exophthalmos remained a "conspicuous disfigurement." He then treated her thymus with radium and x-ray and the improvement was positively marvelous. The exophthalmos disappeared almost entirely.

Von Haberer of Innsbruck, one of Billroth's assistants and later first assistant of Von Eiselsberg in Vienna, in a most convincing paper reports the following case. This patient had a part of his thyroid gland removed in the spring of 1911; in the winter of 1911 the distinguished Prof. Kocher of Berne, ligated the thyroid arteries of the unremoved lobe; but the patient, despite these measures grew steadily worse and in December, 1912, came to Von Haberer in a very desperate condition, so desperate that Von Haberer thought he might die in his office. Eye signs were present, including pronounced exophthalmos. The patient begged piteously for an operation, which was refused. Finally, though assured that he could not survive an operation of any sort, Von Haberer under local anaesthesia removed after prolonged search a small piece of thymus. The result was amazing. The patient was dis-

charged in two weeks, and three months later was found subjectively and objectively practically normal;—a few months afterward he climbed for sport a mountain over 7,500 feet high.

The symptoms of Basedow have been classified into two groups, according as to whether they are sympathetico-tonic in origin or vago-tonic. For instance, the exophthalmos, positive Moebius and dry bulbs are thought to be sympathetico-tonic; whereas the V. Graefe and wide lid clefts and increased lachrymation are ascribed to vagus stimulation. Several authors—Eppinger, Garré, Von Haberer, etc., say the vagotonic symptoms of the Basedow complex indicate a preponderate influence of the thymus. Halsted in his Harvey lecture questions whether we definitely know what these symptoms are. "For example the protrusion of the eyeball, according to MacCallum and others may be caused by stimulation of the sympathetic. If it is true that this is a sympathetico-tonic symptom, and if the thymus were activated solely by the autonomic system, the excision of this gland might not be expected to affect directly and promptly the exophthalmos. But as a matter of fact, recession of the eyeball in at least one of Von Haberer's cases was much more prompt than has perhaps ever been observed after strumectomy alone. Moebius' sign, the incomplete convergence of the eyes is assigned to the sympathetico-tonic group. It was explained by the late Dr. Landström and his supporters as due to the contraction of the Müller-Landström muscle, which is responsible for the protrusion of the eyeball and by the particular arrangement of its fibers to embarrass the action of the internal rectus. But the eyeball may promptly recede after thymectomy, and with its recession the Moebius sign may vanish, which is contrary to what might have been expected of a sympathetico-tonic symptom after excision of an organ activated chiefly by the autonomic or vago-sympathetic system." Whatever the explanation, it may be accepted as proven that increased activity of the thymus is responsible for certain eye signs and symptoms.

The U. S. Census Bureau is publishing an elaborate report on the condition of the blind as revealed in the census of 1910, together with an intensive study of the data and summary of the various state laws relating to the prevention of blindness.

THE PRESERVATION AND MOUNTING OF EYE SPECIMENS FOR MUSEUM AND TEACHING PURPOSES.

BY

HENRY ALBERT AND VERPLANCK BENNETT.

(From the Department of Pathology and Bacteriology, University of Iowa, Iowa City, Iowa.)

The preservation of eye specimens does not differ materially from that of other tissues of the body. The mounting of such for museum or teaching purposes presents, however, a number of special problems due to their small size, the delicate nature of their lesions and the necessity for the fixation of the specimen in a proper position so as to show the various structures and lesions to best advantage.

To accomplish these ends, the need for a special jar for the mounting of eye specimens has long been recognized. Of the several types of eye jars that have been placed on the market, the one most commonly used consists of a shallow cylindrical-shaped jar against the flat bottom of which the cut surface of an eye, cut in two, is to be placed. The cover of the jar is sealed on with glue or cement. We have recently had occasion to examine several hundred eye specimens mounted in this manner, some of which had been prepared as long as ten years ago. We found but few specimens which were perfectly sealed and which had therefore permitted evaporation to take place with subsequent shrinkage, cracking and darkening of the mounting medium and, in the course of time, deterioration of the specimen itself.

Another jar that has been used somewhat is shaped like a wide-mouthed bottle. The mounting medium that is used remains in a fluid state. The jar is sealed by means of a perforated rubber stopper. The opening in the rubber stopper permits the escape of air bubbles and excess fluid while the stopper is being forced into the neck of the jar. This opening is then closed with sealing wax or like substance. The results with these jars have been even less satisfactory than with the one just described due principally to imperfect sealing and the difficulty of so fastening the specimen in place as to keep it from moving about.

In both of these types of jars, the label is placed on the outside. The frequent handling of such jars, tends not only

to cause such labels to be soiled but in many instances, to come off.

In response to a request from Dr. L. W. Dean, whose col-

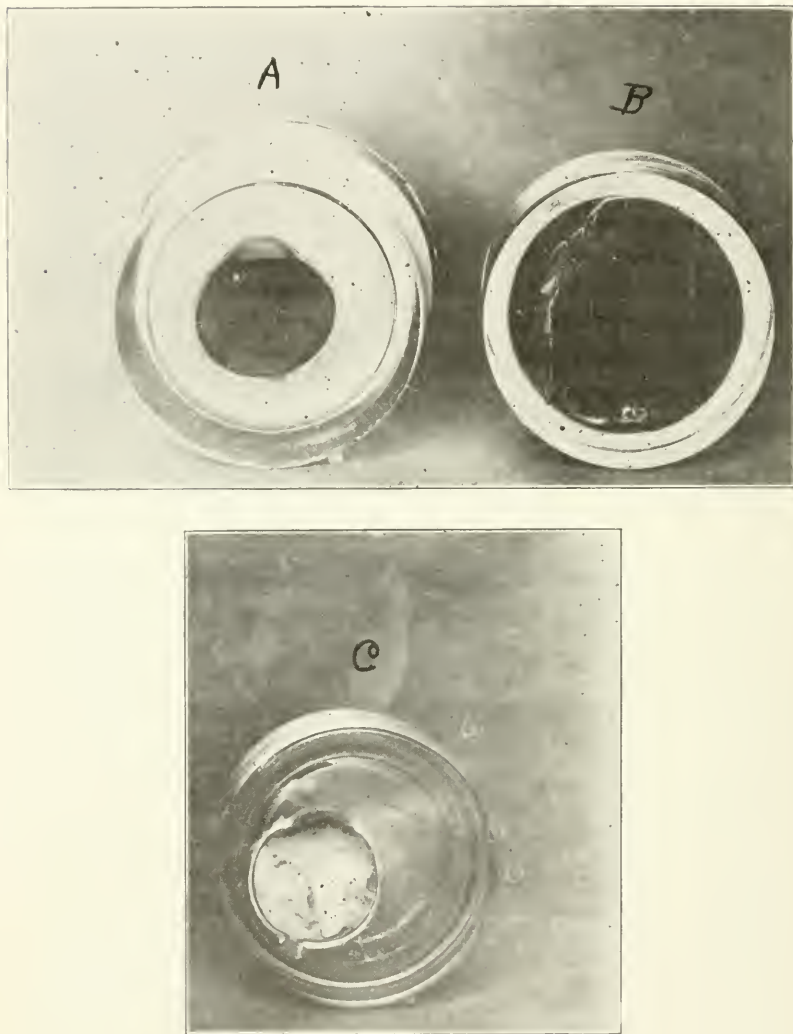


Fig. 1.—Three Types of Eye Jars, Showing Result of Mounting.

A—New type designed by Albert.

B—Type in common use showing cracking of gelatin due to evaporation—the result of imperfect sealing.

C—Bottle shape type—the specimen can move about in the fluid.

lection of eye specimens at the University Hospital had suffered considerably from the deterioration referred to, to have his collection remounted, a new eye-jar was designed by one

of us (Albert).¹ We believe that we have succeeded in designing a jar which will permit the jar to remain sealed in a permanent manner without evaporation of the mounting medium and, by mounting the label on the inside of the jar, prevent the label from being either soiled or lost.

Description of New Jar.

The jar, as will be noted from the accompanying illustration, has two covers—an inner one which rests on a shelf in the jar and an outer one which is for the purpose of sealing the jar. The inner of the two covers is made of white opaque glass to furnish the proper background for the specimen. The outer cover is made of transparent glass beneath which the label is placed—thus insuring permanency of the label. Between the two covers is a space which is filled with marine glue.

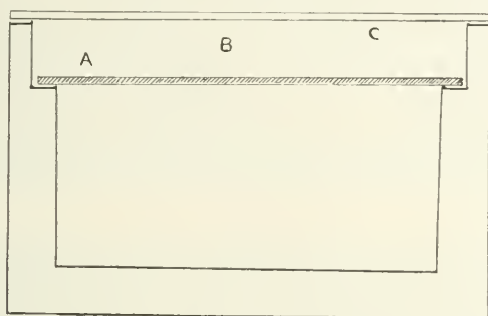


Fig. 2—Section of eye jar designed by Albert.
A—Outer cover of transparent glass beneath which label is attached.
B—Inner cover of white opaque glass.
C—Space between two covers to be filled with marine glue.

Method of Mounting Eye Specimens in New Jar.

The following outline of procedure is copied from a paper on this subject presented by the authors at the last meeting of the American Section of the International Association of Medical Museums.²

1. Wash specimen as soon as possible in ordinary tap water to remove blood.
2. Place in a 4% solution of formaldehyde (one part formalin to ten parts of water) for three days or

¹Albert, Henry. A new Museum Jar for the Preservation of Eye Specimens. *Jour. Amer. Med. Assoc.*, Oct., 1915, Vol. LXV, pp. 1278 and 1279.

²Albert, Henry and Bennett, Verplanck. A New Museum Jar for the Preservation of Eye Specimens, Bulletin No. VI, The Internat. Assoc. of Medical Museums, Ann Arbor, Mich.

longer, using preferably not less than two ounces of the fluid.

3. Cut eye in two with a sharp knife. This can be best accomplished by wrapping the eye in a piece of



Fig. 3.—Several Views of the New Type of Eye Jar Designed by Albert.

A—Jar empty. Note the two covers—the smaller white opaque one which is to rest on the shelf edge which may be seen in the jar, and the larger transparent one which represents the outer cover.

B—Jar, with specimen mounted, on its side. Note the space between the two covers. Note also that the Museum Number has been placed on the outside so that it may readily be changed.

C—Jar viewed from the bottom to show specimen mounted.

D—View of top of jar showing label mounted permanently beneath the outer transparent cover.

waxed paper and making the specimen rigid by freezing with ice (or better ice and salt) after which the waxed paper is removed and the eye cut in two with a sharp long-bladed knife. It requires from two to three hours to properly freeze the eye.

4. Place the cut specimens in ordinary tap water to thaw.
5. Place specimens in 30% solution of glycerin (in water) for one day.
6. Change to 50% glycerin (in water)—one day.
7. Drain off excess of glycerin solution and place specimen (one-half eye) with convex surface downward in eye-jar.
8. Pour in glycerin-gelatin (previously prepared and again liquified by gentle heating in a double boiler) filling the jar up to the level of the shelf on which the inner cover is to be later placed. The glycerin-gelatin is prepared as follows:
 - a—Place one ounce best clearest gelatin (Gold Label) in eight ounces of hot distilled water.
 - b—When dissolved, add the beaten whites and shells of two eggs, place on water bath and heat gently with constant stirring until the coagulated albumen rises to the surface—leaving a clear liquid. Filter, while hot through filter paper (preferably) or absorbent cotton. (A preliminary passage through cheese cloth will remove the larger particles and facilitate filtration through the paper.)
 - c—Add to the filtered gelatin, an equal amount of pure clear glycerin and five drops of carbolic acid.
9. Turn eye specimen over by means of forceps—being careful that no bubbles of air are caught beneath the specimen.
10. Add 20 drops of formalin (40% formaldehyde sol.) to the gelatin after it has cooled somewhat, but while it is still liquid. Mix. This will prevent the reliquefaction of the gelatin.
11. Allow gelatin to “set”—being careful that the specimen properly retains its position in contact with the flat surface of the jar. Solidification may be facilitated by placing specimen in ice water. Remove bubbles from surface while gelatin is solidifying.

12. Fill jar with liquefied glycerin-gelatin and add five drops of formalin (40% sol. of formaldehyde). After the bubbles have come to the surface, but while the gelatin is still liquid, slide the inner cover (of white opaque glass) in place on shelf of jar—being careful that no air is introduced beneath cover.
13. Let stand for 48 hours to permit gelatin to become fixed by the formalin.
14. Prepare label as follows:—
 - a—Cut a circular piece of thick white smooth paper of size of inner cover.
 - b—Write name of specimen, etc., with black India waterproof ink. Dry thoroughly.
 - c—Fasten label on either side of outer cover (of clear glass) by means of mucilage. The labeled side of the paper should, of course, be toward the glass.
15. Remove all gelatin from jar above the inner cover, wipe the glass clean with a damp cloth.
16. Place specimen in ice water—being careful that the water does not extend beyond the level of inner cover.
17. Pour dish level full of marine glue (special), heated *just enough* to permit it to flow. (The marine glue should be heated in an iron ladle and kept well stirred.)
18. Heat edge of dish and border of outer cover on labeled side carefully by means of a Bunsen burner, and apply cover to jar while hot. Press cover down firmly—squeezing out excess of marine glue.
19. Trim off excess of marine glue and smooth off with xylol.

Remounting of Eye Specimens.

When it is desired to remount specimens which have been mounted in gelatin medium in jars of the older unsatisfactory type, the specimen with the surrounding gelatin should be carefully removed from the jar and placed in luke-warm water to liquefy the gelatin. If formaldehyde was added to the medium at the time of mounting it will probably not reliquefy. In that event the solid pieces of gelatin should be carefully broken away from the specimen. When the gelatin has been removed, the specimen is remounted in the new jar

in new glycerin-gelatin in accordance with directions given in the outline. It is not always possible to remove all pieces of gelatin from the specimen without injuring it. It has been found that the presence of a small amount of old gelatin does not particularly interfere with the making of a good new mount. After the old gelatin has been broken off the specimen will often present a rough delapidated appearance. It is, however, surprising to note how well such specimens will appear after they are properly mounted.

Preservation of the Natural Color of Eye Specimens.

When eye specimens are preserved and mounted in the manner just described, the color of all structures except those due to blood are very well preserved. The dark pigment of the iris and choroid is not altered in the least. Opacities in the cornea and lens are well shown. For normal and indeed many of the abnormal eye specimens, little is to be gained by trying to preserve the eyes in their natural color. There are however, many pathological eye specimens more especially those which are affected by certain tumors, hemorrhagic or acute inflammatory processes, in which it is highly desirable to preserve the natural color of the tissues which contain a considerable amount of blood. For the preservation of the natural color, either the Kaiserling or the Delépine method may be used. We have obtained the best results with the latter method. We shall nevertheless give the details of both.

Kaiserling Method for the Preservation of Natural Color.

(As applied to the mounting of eye specimens.)

In preparing specimens by this method it is necessary to run them through three different solutions. After the specimen has been washed free from blood, it is placed in Solution No. 1 which consists of:—

Formalin (40 per cent formaldehyde)	200cc.
Potassium nitrate	15 gm.
Potassium acetate	30 gm.
Water (distilled)	1000 cc.

In this fixing and hardening solution in which it is left for three days, all color due to blood practically disappears. It is now cut in two as mentioned in Note 3 under "Method for Mounting." It is then placed in Solution No. 2 which consists of alcohol (ethyl, 95%) in which it is left for one to two hours. In this solution the blood color of the specimen will return. Changing the solution with a fresh supply at the end of one

hour, often results in bringing out the natural color to best advantage. Finally the specimen is placed in Solution No. 3 which consists of:—

Potassium acetate	100 gm.
Glycerin	200 cc.
Water (distilled)	1000 cc.

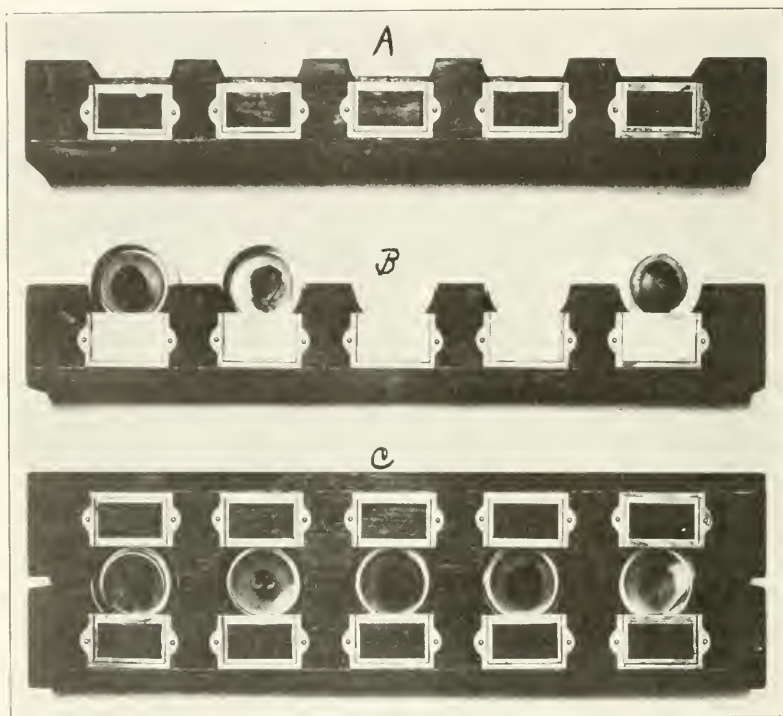


Fig. 4.—Stand for the Proper Exhibition of Eye Jars.

A—Stand without the eye jars and with label holder also empty.
 B—Stand with eye jars and stand labels in place.
 C—Method of using two stands to hold eye jars in position while being transported.

Ordinary pathological specimens may be left in this solution indefinitely. Eye specimens to be mounted in special eye jars should be left in this solution for one or more days to become thoroughly impregnated with it, when they may be mounted in the special eye jars in a medium consisting of one part of gelatin and ten parts of Kaiserling No. 3 solution—prepared according to the directions given for making glycerin-gelatin under Note 8 of "Method for Mounting." The subsequent steps are the same as there given.

Sunlight tends to cause the color to fade. They should therefore be kept in a rather dark place.

Delépine Method for the Preservation of Natural Color.³

(As applied to the mounting of eye specimens.)

Here also, we have to deal with three different solutions. After the specimen has been washed free from blood, it is placed in Solution A which consists of:—

Formalin (40% sol. of formaldehyde)	100 cc.
Water	900 cc.

In this solution the specimen is left for three days, when it is cut in two as already described. It is then placed in Solution B which consists of 80 to 90% alcohol in which it is left for two hours and during which time the original color, which was lost in the formaldehyde solution, is regained.

It is next placed in Solution C which consists of:—

Arsenious acid solution (made by boiling an excess of arsenious acid in water for two hours and allowing the fluid to stand for twelve hours and filtering) . . .	400 cc.
Pure glycerin	600 cc.

In this solution the specimen is left for three days (or longer) when it is in proper condition for the final gelatin mounting medium. As described by Delépine, the final mounting medium is very difficult to prepare. We have therefore modified it by preparing it just as the glycerin-gelatin is prepared as given in Note 8 under "Method of Mounting" except that we use a saturated solution of arsenious acid prepared as given in Solution C in place of distilled water. The subsequent steps are as given under "Method for Mounting." By this method all color due to the presence of blood is somewhat intensified. The color therefore is not quite as natural as when it is prepared by the Kaiserling method. On the other hand the color does not fade on exposure to sunlight and has indeed been found by Delépine to be retained, unaltered, for eighteen years. We therefore prefer to use Delépine's method when we desire to retain the natural color of the specimen.

Method of Displaying Eye Specimens to Best Advantage for Museum or Teaching Purposes.

The shape of eye jars is such that when placed in a case they must rest on a horizontal surface and be viewed from above or be provided with special stands to hold the jars in

³Delépine, Sheridan, *Journal of Pathology and Bacteriology*, Cambridge. Vol. XVIII, No. 3, Jan., 1914.

Also, Royce, C. E.—Delépine's Arsenic-Glycerin-Jelly Method of Preserving Gross Specimens. *Bulletin No. V. The Internat. Assoc. of Medical Museums*. Montreal, Canada, page 76.

position. For this purpose we devised a stand made from a block of soft wood which measures 18 inches in length, $2\frac{1}{2}$ inches in height and $1\frac{3}{4}$ inches in thickness. Half cylinder holes, $2\frac{1}{8}$ inches in diameter at the top and $1\frac{1}{2}$ inches in depth are made by boring holes in a block of wood of twice

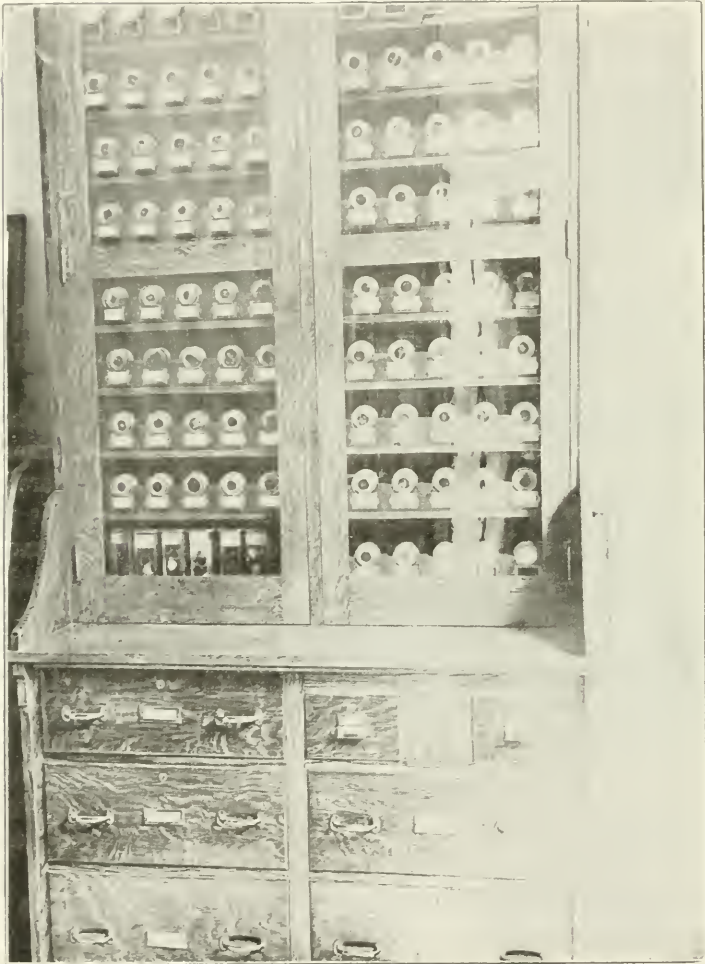


Fig. 5.—Case for the Exhibition of Eye Collection of Dr. L. W. Dean, University Hospital, Iowa City, Iowa.

the desired height and then sawing it in two—thus making two stands.

The holes are of course for the reception of the eye jars. Stained black, the stand furnishes a desirable back-ground for the eye jars with their white opaque inner covers.

In front of the stand and slightly overlapping the holes for the eye jars, a small label holder may be fastened. This serves not only to hold the label but also to sufficiently hold the eye jar in place so as to be able to carry a stand full of specimens from place to place without any great danger of having the specimens fall out.

Each eye specimen has, on the label on the inside of the jar, not only the name of the lesion, but also an abbreviated clinical history, the clinical record number and the pathological accession number. It can therefore be readily identified. When arranging a collection of eye specimens, they should also have a museum or case number. If the case is a fairly permanent one and the eye specimens are to be added in consecutive order as additions are made, the museum number may be placed on the inside of the jar. If, on the other hand, there is a likelihood that the specimens will be moved or their relative position altered, it is advisable to place the museum number on the outside of the jar since then it may readily be changed.

On the stand label should be written the name of the specimen and its museum number so that a specimen removed from the stand, may readily be returned to its proper place.

Case for Exhibition of Eye Specimens.

The stands described, filled with eye specimens should be placed in a case in order to be displayed to best advantage and to be most serviceable for teaching purposes. An ordinary book case may be converted into such a museum case or a special case may be built for that purpose as was done for the collection in the Iowa State University Hospital.

The shelves were made adjustable so as to make provision for additional specimens. The drawers in the lower part of the case are for the purpose of keeping the pathological records of the specimens; a cross index of the various parts affected and the types of lesions, surplus empty jars and material for mounting the specimens.

The distinct advantages of the jar and method of mounting eye specimens as described in this article, over those heretofore used, are that they insure:

(1) Permanency of the preparation; (2) neatness and permanency of the label.

The jar here described is manufactured by F. A. Hardy & Co., Chicago, Ill.

The marine glue used by us was obtained from Binney and Smith, 81-83 Fulton Street, New York, under the name of Light Marine Glue. It is also supplied by the maker of the jar.

CASE OF UNILATERAL WOOD ALCOHOL RETRO-BULBAR NEURITIS.

BY
H. W. COWPER, M.D., F.A.C.S.

INSTRUCTOR IN OPHTHALMOLOGY, UNIVERSITY OF BUFFALO.

Miss B., age 35, American. Family history unimportant.

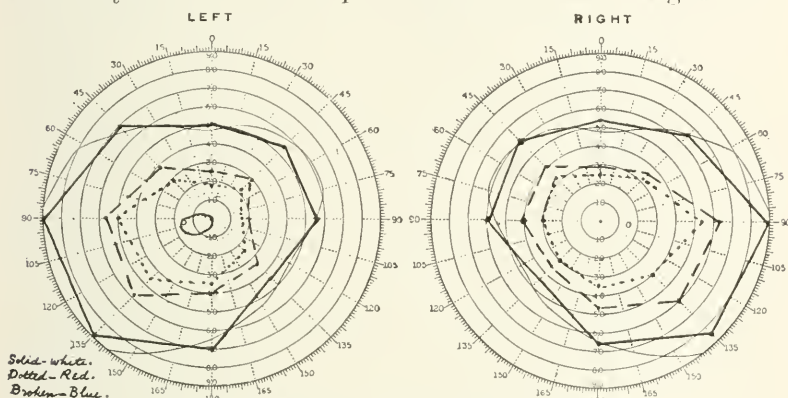
Personal history:—Some years ago she was an alcoholic. In the winter of 1914 she was a patient in the General Hospital. Diagnosis, gastric hyperacidity, enteroptosis, and neurasthenia. Otherwise the personal history is unimportant.

I went over her eyes at that time. They were normal except for a small amount of hyperopic astigmatism. Less than a year ago I saw her again when the vision with each eye was still normal.

Present illness:—About the end of February of this year (1916) she drank wood alcohol. Over a period of two weeks she took a "couple of swallows" on five or six occasions, thinking it was gin. (There is no doubt as to its having been wood alcohol. The owner of it is a saloon keeper, so he should know. He kept it for use externally after bathing. Subsequently I presented to her separately methyl alcohol, ethyl alcohol, and gin. While her selection of that which she had been drinking was not with great positiveness still she chose the methyl alcohol as more nearly resembling it than the others.) On the day after she took the last "swallow" she became weak, dizzy, and of uncertain gait, and that evening there was a violent attack of vomiting. The next three days she was confined to her bed and seemed so sick that her friends had the last rites of her church administered to her. A few hours after the attack of vomiting she first noticed disturbance of her left vision. She describes it as though black strips were in front of the eye. Very soon this was followed by definite blurring. She was again taken to the General Hospital. She states that after a few days the vision improved, but the improvement lasted only a short time when the vision again became worse. Her right eye was never subjectively affected. There never were acute abdominal symptoms as violent pain or diarrhoea.

I saw her for the first time in this present illness on April

18, 1916. She came to the office after leaving the hospital. R. V. was 20/20, L. V. 20/200. Pupils were equal and active. Ophthalmoscopic examination was negative except that the temporal half of the left nerve was paler than that of the right. During the next two or three weeks the atrophy became well marked and the vision diminished to counting fingers at three feet. The fields taken three months after the poisoning show in the right no abnormality except possibly slight contraction of the blue and red. In the left there is no contraction of the white but a definite concentric contraction for the colors and a scotoma extending from the fixation point to the blind spot. Upward and inward the scotoma extends not at all beyond the fixation point while downward it goes five



Fields Three Months After Wood Alcohol Poisoning.

degrees and outward fifteen. The scotoma is absolute. Fields were taken in a moderately bright light with one centimeter square colors. Fields for yellow and green were not taken, but it was determined that there was no central scotoma for green in the right. Urine examinations have been negative as has also one Wassermann. At my request Dr. Fairbairn made a nasal examination for the especial purpose of excluding if possible sinus trouble. No abnormal condition was found.

I have examined the reports of over two hundred cases of wood alcohol amblyopia and there was not one in which one eye escaped. This case is possibly unique in that respect and consequently worth reporting.

In many of the cases reported one eye was more seriously damaged than the other. Any explanation accounting for this selective action would apply equally well to such a case as the above.

MASSAGE OF THE EYE.

BY

OTTO WIPPER, M.D.

CHICAGO.

Massage in general has been practiced extensively from antiquity with good results in many conditions. In time the term massage became rather ordinary so that the experts had to make scientific classifications of the different methods, and once in a while new terms were introduced, giving this practice the necessary air of mystery, which makes it more attractive to the laity and which is essential to the success of the quack. Nevertheless, massage is of great value and I think that it is not sufficiently applied in eye-conditions.

Aside from the treatment of trachoma and glaucoma it is very little recommended.

After the tension in glaucoma has been taken by digital examination several times in succession we notice a marked decrease. Therefore, the patient should be instructed to massage the eye several times daily, unless the pain is too severe.

In the treatment of trachoma massage is of the greatest importance and usually has to be done frequently after once the granules have been thoroughly expressed. While the use of the file and the figleaf by the ancients, as well as the rubbing with the brush or sandpaper, or the caustic stick in modern times cannot strictly be termed massage, yet they are closely allied to it. The frequent rubbing with a mild antiseptic powder, preferably one with some nutritive property gives excellent results.

In corneal opacities the massage with the yellow oxide ointment is recommended; it is often efficacious, although the yellow oxide occasionally produces an irritation and has to be stopped. One of the most effective treatments for late opacities is to gently rub the cornea with a smooth rounded instrument after previous cocainization, and the patient should do his share by massaging the cornea through the lid several times daily.

It is also well known that a small chalazion may be aborted by frequent massage. In other lid affections such as scars, ectropion and entropion massage is of value. Occasionally massage will increase the effect of an operation, especially after those for glaucoma.

Now the conditions in which massage is very much neglected are ocular deviations and ametropia. In ocular deviations a great deal of good can be done by gentle massage of the weak muscle but still more by a somewhat forced rubbing or rather stretching of the strong muscle towards the limbus. If carried out persistently this treatment is very effective and should be one of the routine measures in all cases.

As to ametropia we know the principal cause of the elongation of the myopic eye; it is the pressure upon the globe by the extrinsic muscles: hence it is plausible that pressure upon the polar ends of the globe would produce the opposite effect, provided it is done early in life when the sclera is still pliable. although improvement may be obtained at any age. Massage with pressing back can only be of benefit, and in addition a pressure bandage should occasionally be carefully applied.

In cases of hypermetropia we would naturally try to increase the length of the globe in exerting compression near the equator. This is best accomplished by placing the thumb upon the temporal and the index finger on the nasal side.

It goes without saying that this latter method must also have a beneficial influence upon hypermetropic astigmatism, in which the 180 meridian has the lesser curvature. On the other hand stroking the cornea over the vertical meridian would be indicated in myopic astigmatism.

Of course a great deal of harm may be done if such treatment were left to the inexperienced. It certainly is contraindicated in many conditions, and can only be of benefit if done by the oculist himself or under his close observation.

Last but not least let us remember the tired eye; the good one experiences after a short gentle massage we all know.

A CASE OF DIVERGENT STRABISMUS COUPLED WITH AUTONOMIC CONTROL OF THE REFRACTIVE STATUS OF THE EYES AND THE TREATMENT THEREOF.

BY

CHARLES SHEARD, PH.D.

DIRECTOR AND PROFESSOR OF APPLIED OPTICS, THE OHIO STATE UNIVERSITY

During the past year two cases of divergent strabismus, coupled with a marked difference in the refractive conditions of the eyes dependent, apparently, wholly upon the relative

co-ordination or inco-ordination of accommodation and convergence which was subject to the volition of the examined party, have come under the writer's observation. A cursory search of ophthalmic literature has not evidenced any material dealing explicitly with such conditions except possibly brief references in the writings of Savage and of Worth to which reference will be made in the concluding paragraphs of this paper. The case to be reported upon at this time has aroused the interest of and stimulated discussion amongst a number of practitioners upon the eye and is presented to the readers of THE RECORD for their consideration, comment or criticism.

CASE. Mr. H. S.; aet. 22 yrs.; student in the university; presented himself wearing the following correction: O. D. +1.00 D. S. \ominus 1° prism base in; O. S. +1.25 D. S. \ominus 1° prism base in. Stated that he had trouble in coördinating his eyes when reading; was conscious of an outward turning of the left eye particularly, although he discovered at times that the left eye was the fixing eye with exotropia of the right eye. Had been under various treatments such as prism and taper exercises, prisms in position of relief and various methods of fusion training with no apparent benefit. Had been able from early childhood to readily dissociate his eyes and found that this condition involuntarily occurred as he grew older and had become worse during his collegiate career. Stated that his father was afflicted in some such manner also.

Retinoscopically, each eye covered in turn and fixing at 20 feet, it was found that +1.25 D. S. O. U. satisfactorily corrected the refractive condition exhibited and gave, each eye tested separately, a visual acuity of 20/20. When, however, both eyes were left uncovered, with fixation at 20 feet, the following facts were discovered: in one position or condition of the eyes in which, presumably, diplopia was ignored or suppressed, the above hyperopic corrections were obtained, but at the will of the patient and upon signal from him he was able to readjust his accommodation and convergence relations in such a manner that the retinoscopic findings showed O. D. —1.50 D. S. \ominus +0.25 cyl. ax. 180° and O. S. —1.00 to —1.50 D. S. Great accuracy cannot be claimed for these findings since slight variations in the refractive conditions occurred as seems reasonable in the light of the discussion to follow. A subjective examination with O. D. —1.25 D. S. and O. S. —1.00 showed that $V=20/20$ to $20/15$ in each eye with prac-

tical equality when tested very quickly by shifting a cover from one eye to the other, but was erratic or failed to give more than 7/10 vision monocularly if the other eye was covered for any length of time. Likewise the patient stated that he was unable, when wearing these minus glasses, to get his eyes back into the previous, or presumably dissociated, condition. The methods of dynamic skiametry, calling for binocular vision where possible and hence some correlation between convergence and accommodation, when practiced at 13 inches, showed initially a decided "against" motion with the plane mirror, requiring O. D. —1.75 D. S. and O. S. —2.00 to produce reversal. The data thus elicited clearly evidenced the following facts: (1) the refractive error of each eye, axially considered and dissociated from its mate, was hyperopic: the eyes when in this condition or when corrected for this defect were decidedly negatively convergent, (2) when the fusion faculty was exercised and sufficient innervation supplied through the proper centers to give the proper or necessary positive convergence and thus correlate the eyes from this standpoint, the ciliary through the third nerve innervation also responded and caused a lenticular change such as to produce a myopically refractive condition. The logical line of reasoning seemed, therefore, to be somewhat as follows:—the wearing of minus lenses by this hyperope would force the supply of necessary innervation to accommodatively overcome the correction given and thus supply the necessary innervation to produce positive convergence. The writer believes, in conjunction with a considerable number of writers and practitioners, "that whatever may be true of other associated brain centers, it appears that the center of the ciliary muscles and the convergence innervation center can have the associated impulse run in only one direction; that is, from the former to the latter." (Savage, *Ophthalmic Myology*, 2nd edition, page 284).

The duction tests did not give wholly satisfactory or concordant results, but from several sets of data taken within a few days the following represent fairly accurately the ductions.

CORRECTION.

No lens 1.25 O. U. —1.25 O. U.

Right Eye:

Abduction	.....	12°	10°	8—10°
Adduction	.....	18—20	16—18	24

Subduction	2	2	2
Superduction	3	3	3
Left Eye:			
Abduction	10	8—10	10
Adduction	14—18	16	22
Subduction	2	2	2
Superduction	2	2	2

These figures show that abduction is of greater amount than is normally taken as standard; likewise the adduction is less when wearing a plus correction and greater and nearer the assumed 1:3 ratio when wearing the minus lenses. Obviously too much importance cannot be attached to these findings since the innervation to the interni must have been forced and might therefore prove erratic.

The parallax and cover tests disclosed alternating divergent strabismus. With no correction before the patient's eyes, at 20 feet, an exophoria of 10—12 prism degrees was present; when the patient wore —1.00 D. S. O. U. there was still diplopia using the cover test but 2—4 prism degrees base in abolished it; likewise, with this minus correction, the bar test at the reading distance showed that there was a reasonable coördination between the two eyes and that binocular vision was being enjoyed. The verting powers, tested by means of the perimeter, showed abversion 55°, adversion 50°, subversion 45° and supversion 35°, indicating in conjunction with the duction tests that there was not inherent weakness of the interni but rather deficient innervation.

The accommodation was tested monocularly at 13 inches by the employment of minus lenses, the eye reading No. 1 type and wearing —1.00 D. S. These tests showed that the total accommodative power of each eye was 9 D.; but if we consider the fact that each eye was refractively hyperopic by 1.25 D, we obtain 11.25 D as the total accommodative power of each eye.

This case is an interesting problem in ocular economy; since there was a plentiful reserve accommodation it seemed wise to draw upon it in an attempt to aid in the development of convergence. This was accordingly done and the patient received O. D. —1.00 D. S. and O. S. —1.25 D. S. with instructions to wear them while reading, a little at a time at first and constantly later and to report within two weeks. This he did with a favorable report and the statement that the frontal

and occipital headaches from which he had suffered considerably in the past had entirely disappeared. Treatment was continued. Tests made six months later disclosed the following:—(1) he was unable to dissociate his eyes as formerly except under great effort, (2) he read with comfort and enjoyed binocular vision; (3) his distance muscle balance as determined with the Maddox rod showed 3° of *esophoria* and at 13 inches some 4—6 prism degrees of *exophoria* which according to such authorities as Howe, Stevens and Maddox is normally to be expected and is designated as physiologic *exophoria*; (4) he had a convergence reserve of about 12 prism degrees.

Dr. G. C. Savage, in his work on "Ophthalmic Myology," in speaking of non-operative methods of treating *exophoria*, says:—"The pseudo-*exophoria* caused by over-development of the ciliary muscles, requiring less than 1 D. impulse to effect a 1 D. contraction of these muscles, is best treated by the wearing of concave lenses. . . . By so doing a pseudo-*esophoria* is developed which lessens the *exophoria*. If the diagnosis is correct the wearing of concave lenses will be attended by a sense of relief."

Mr. Claud Worth in his book "Squint" devotes a few pages to what he terms "neuropathic divergent squint." He says in part:—"The divergence nearly always dates from infancy. It may be constant or occasional, unilateral or alternating. In the constant cases there is a feeble degree of binocular vision when the eyes are 'straight'; when an eye diverges there is usually no diplopia. The refraction, as a rule, is normal. . . . The divergence varies greatly in degree even in a case in which it is constantly present. This is due, not to any variation in the motor balance of the eyes in the position of rest, but to the varying effort of dynamic convergence by which the patient unconsciously endeavors to correct the faulty relative positions of the eyes. The power of dynamic convergence is always deficient. . . . In these neuropathic divergent squints, the association between accommodation and convergence is usually very slight. One not infrequently sees a patient who can nearly always voluntarily correct the faulty position of the divergent eye without much effort, but who habitually allows this eye to diverge while he is exercising say 3 or 4 D. of accommodation in near vision." . . . "Treatment:—There is seldom any notable refractive error and when there

is its correction produces no effect upon the divergence. *Attempts at fusion training* nearly always fail, however early the patient may be seen. One's only *recourse is operation*.

The case in hand the writer believes falls within these general classes of pseudo-exophoria or neuropathic divergent squint. Without doubt the only other remedy would have been recourse to operation had the treatment as outlined above failed. There is a question, of course, as to the permanency of the results and as to future procedure when increasing years bring the resultant decreasing accommodative power. But many cases of convergent squint, which have been slated for the operative table, have been straightened out and permanently relieved by a judicious employment of plus lenses to inhibit and choke off accommodation and thereby relieve the excessive convergence. There seems to the writer to be no reason why the converse proposition may not be advantageously employed at times and minus lenses used to stimulate accommodation and thereby supply innervation to the interni and aid the convergence provided, of course, the operator experimentally determines whether or not the accommodative reserve is sufficiently large as to permit of its expenditure in the interests of a satisfactory correlation between accommodation and convergence.

NOTE—At the end of six months' time, following the improvement in the dynamic convergence recorded above, the lenses were reduced in power and the patient was given O. D. -0.75 D. S. and O. S. -1.00 to be used when reading.

Dr. A. E. Prince has arranged for a symposium clinic on the second Monday of September, October, November and December. All the Eye and Ear Surgeons are invited.

REPORTS OF SOCIETIES

CHICAGO OPHTHALMOLOGICAL SOCIETY.

WILLIAM E. GAMBLE, M. D., PRESIDENT.

FEBRUARY 14, 1916.

Dr. Harry S. Gradle reported a case of Conjunctivitis Hypertrophica Plasmocellularis, and exhibited the patient.

DISCUSSION.

Dr. Francis Lane stated that the sections of the tissue given him by Dr. Gradle were not satisfactory, owing to imperfect paraffin embedding. However, all the layers of the conjunctiva were hypertrophied. The epithelium was thickened and contained numerous goblet cells throughout. Those in the superficial layers of the epithelium were the larger and appeared to have open stomata, as if expelling their contents.

These cells were first described by Stieda a number of years ago, and were increased materially in chronic conditions of the conjunctiva and have been compared with the cells of the mammary gland in that they are not deformed after expelling their contents. They are true unicellular mucous glands, and it is because of their integrity that the epithelium does not desiccate after the extirpation of the lachrymal glands.

The basement membrane is rather wavy and the sub-epithelial stratum is infiltrated with both large and small plasm cells with a certain amount of connective tissue formation, indicating a chronic process.

The so-called fibrous stratum, instead of consisting of dense connective tissue, is markedly infiltrated with small round cells and fewer large fainter staining cells almost like epithelial cells undergoing degeneration.

In no sense of the word does the microscopic picture resemble trachoma, follicular conjunctivitis, spring catarrh or tuberculosis, but more like lymphoid hypertrophy of both layers of the substantia propria.

Dr. Harry S. Gradle, in closing the discussion, stated that a case, very thoroughly studied, was reported by Elschnig in the *Medicinische Klinik* of 1914. This was an acute case, therein differing from the others, which were of the subacute or chronic type. In Elschnig's case, which was treated for over five months, a cure only followed complete excision of the transitional folds, and a large portion of the palpebral conjunc-

tiva. The blood picture returned to normal shortly after the patient was cured. The pre-auricular and submaxillary lymphatic glands in this patient were extirpated and found to consist of lymphoid hyperplasia; consequently Elsehnig considered this a local manifestation of a general disease affecting the lymphoid-producing structures of the conjunctiva, the infection manifesting itself by swelling of the pre-auricular and cervical glands and by a peculiar plasmocellular hypertrophy of the conjunctiva. We cannot take it for granted that a generalized infection is essential here because the conjunctiva in itself is a part of the hematopoietic system, in that it can produce new lymphocytes; we, therefore, are dealing probably with a localized rather than generalized condition.

The speaker said he would follow the suggestion of Dr. Suker of massaging with 10 per cent ichthyol ointment because the boy has shown improvement under two per cent solution of ichthyol. Before he attempts excision of the transitional folds, he will try this.

Cyst of the Iris.

Dr. Fred W. Bailey, Cedar Rapids, Iowa: The patient is Miss C., aged 16, whom I brought here with a provisional diagnosis of cyst of the iris following traumatism. This girl was injured eight years ago by a punctured wound which penetrated the cornea in the upper nasal quadrant for a distance of one-eighth of an inch. She was incapacitated for two weeks at the time, and from that time on she noticed nothing wrong with the eye until last November, when she was husking corn in the field, and one of the men, in throwing an ear of corn in the wagon, accidentally threw it against her eye and caused pain. She said her sister looked at the eye and noticed a growth in it which almost covered the entire pupil, as she stated.

I saw the patient three weeks after this, at which time there was a growth in the anterior chamber, which almost filled the entire pupillary area. After introducing homatropin and dilating the pupil, I noticed there was not only a growth in the anterior chamber, but one in the posterior chamber, which was a little lower down, and also toward the nasal side, and which was pigmented. Those who saw the case noticed the growth in the anterior chamber as non-pigmented and absolutely translucent, while the one in the posterior chamber is pigmented.

I brought the patient before the society because I was rather undecided just what to call it. I have called it a cyst of the iris, but I am undecided as to the nature of the growth in the posterior chamber, wondering whether it might be malignant because of the pigmentation.

Dr. Suker called it an autogenous implantation cyst of the iris caused by proliferation or growth of the iris. But this is monolocular and the anterior cyst seems clear. Some of the flocculent material in the cyst is clear down to the bottom of the cyst, forming a more dense picture. The entire iris can be seen through the cyst. The lens is uninjured, except when it is distorted.

The question is what to do in a case like this. Dr. Suker suggested that the first thing to do would be to aspirate the cyst, and after to do an iridectomy to see whether or not we are right.

DISCUSSION.

Dr. Oscar Dodd recalled a case he had some years ago of punctured wound of the cornea, but in this case there was a traumatic cataract. Within a few months after the removal of the cataract a cyst developed, the man disappeared from view, and returned subsequently because of pain in the eye due to tension. On examination there was a multilocular cyst filling over one-half of the anterior chamber. After removing the cyst he made an incision and removed as much of the cyst wall as he could. The eye quieted down and for several years gave no further trouble.

Such cases were not very common. One such case was reported by Weeks before the American Ophthalmological Society, with good drawings of the case, the report having been published in Knapp's Archives.

Dr. George F. Suker read a paper on "Classification of the Various Types of Inflammation of the Orbital and Cranial Portions of the Optic Nerve from the Clinical Pathological Standpoint."

COLORADO OPHTHALMOLOGICAL SOCIETY.

MELVILLE BLACK, M. D., PRESIDING.

APRIL 15, 1916.

Dr. E. T. Boyd, secretary, submitted a very complete report for the year ending April 15, 1916, in which he tabulated the number of cases presented at the meetings and the diagnosis

of each case. The Society voted to submit his report for publication in the *Ophthalmic Journals* and in *Colorado Medicine*.

Dr. E. F. Conant, of Denver, was elected treasurer for the ensuing year and Dr. Frank R. Spencer, of Boulder, secretary. Dr. J. A. Patterson, of Colorado Springs, was elected a member of the executive committee.

Dr. H. L. Baum, of Denver, demonstrated the anatomy of a modification of the West intranasal operation on the tear sac. The object of this operation is the establishment of permanent drainage from the sac into the nose, this including the removal of a part of the lachrymal bone and the inner wall of the sac. He devised an instrument for this purpose, like a curette, oval in shape with sharp edges and set at right angles to the handle. The bowl is so turned that when in place in the nose, with the handle at an angle of about forty-five degrees with the perpendicular, the cutting edges of the instrument are directed downward.

A one-quarter per cent solution of Novocain with the addition of a small amount of adrenalin is injected under the mucous membrane of the operative field and also from the outside by direct puncture of the skin into the tissues surrounding the sac, particularly between the sac and the bone of the lachrymal fossa.

After instillation of about a ten per cent solution of cocaine into the conjunctival cul de sac, the punctum is dilated and a probe passed into the duct far enough to retain it in position, where it may be left during the operation as a landmark.

A flap of mucous membrane is now elevated somewhat larger than the size of the bone to be removed and from that location this piece of membrane being taken out entire. This procedure is for the purpose of preventing closure of the artificial opening in the bone by regeneration of the mucous membrane.

Knowing that the lachrymal bone is posterior to and articulates with the ascending process, it is a very easy matter to feel one's way with the instrument until this soft bone is reached, when it is broken through and curetted out, thus uncovering about the posterior two-thirds of the sac. The curette is now carried directly downward until it enters the duct, which it is advisable to open for a short distance.

Next insert the curette through the opening already made

and, with firm counter pressure from the outside, remove the internal wall of the sac with one or two sweeps of the curette. The shreds of tissue which the instrument brings through into the nose are now removed with forceps, following this with a further curettement against the anterior external surface of the ascending process to remove all remnants of the sac wall and smooth the bony surfaces remaining.

It is now possible to pass a large probe into the nasal cavity and to demonstrate by its excursion that there is a free opening into the nose.

The after treatment consists in the application of strong silver nitrate solution in the nasal opening to prevent excessive granulations and cicatricial closure. Probing is also indicated, although has not seemed necessary.

Dr. Baum exhibited instruments which he had devised for use in this operation.

DISCUSSION.

Dr. E. R. Neepcr, of Colorado Springs, stated that he advocated trephining the tear sac by passing a $2\frac{1}{2}$ mm. trephine into the sac after splitting the canaliculus with a Bowman's knife. He stated that two or three turns of the trephine usually enabled the instrument to enter the nose through the thin bone of the lachrymal fossa, and he could remove the button of bone encircled by the trephine. Applications can easily be made to the passage and it remains open. He had operated ten to twelve cases to date and feels that the results have been quite satisfactory. He was led to do this operation after giving it a thorough trial on lower animals.

Dr. Wm. C. Bane, of Denver, exhibited a trephine, about three millimeters in diameter, which he had devised for operating on the tear sac through a slit canaliculus.

In closing the discussion, Dr. Baum very modestly claimed no originality for the operation, but stated that the instruments were his. He thought slitting of the canaliculus was objectionable to some ophthalmologists and shouldn't be performed. Dr. Neepcr added that the slit soon closes and, therefore, isn't objectionable.

Drs. Wm. C. and Wm. M. Bane, of Denver, presented the following cases:

Case 1.—D. S. Italian. Age, 29 years. About seven o'clock on morning of March 28th, while chopping wood, he

was struck in the right eye by a long piece of kindling. Injury to eye was very severe and he took the next train to Denver, and came to the office about two o'clock, suffering considerably. Vision in left eye was light perception. The cornea was severed from its attachment in a crescentic line around the upper and nasal borders, including about half the circumference. The eyeball was collapsed and the corneal flap turned back on its self, exposing the vitreous. Iris considerably torn and distorted. No lens detected, and about one-half or more of the vitreous had escaped.

After instillation of cocaine four per cent, corneal flap was turned back to nearly original position and stitched in place. The eye was covered with a pad, and has been dressed each day with instillation of atropine.

Vision has been improving so that he now counts fingers readily. The lost vitreous has been practically all restored, but there has been a little leakage continually at the wound edge, which has been pushed forward and kept open by a part of the iris. When bulging of wound was noticed eserine was begun.

The left eye with an extreme projection of the cornea had vision of 5/30, but with a plus 2.00 sphere combined with a minus 11.00 cylinder at axis 65° vision comes up to 5/10.

Case 2.—Miss L. M. Age 30. Stenographer. Past history: Severe nervous shock five years ago due to the sudden death of her father and mother, from the effects of which she has never completely recovered. Trouble with the eyes began three years ago, when she had double vision, one object appearing directly above the other. This lasted some time, finally disappearing. In October, 1915, pupil of the right eye became widely dilated, she was unable to rotate the right eye upward and there was marked drooping of the right upper lid. Potassium iodide was prescribed at that time, and there has been some improvement during the past six months. At no time has she had pain or headache, and the vision has remained normal. Examination: Patient first seen April 1st, 1916. Vision, R. and L., 5/5. Fields were normal for white. Pupils, right larger than left, about 4 mm. in diameter, somewhat irregular, and quite sluggish to light and to accommodation. Left pupil normal. Muscles: Weakness of levator of right upper lid, with slight drooping. Almost complete paralysis of

the right superior rectus. Exophoria 30 degrees and left hyperphoria 14 degrees. Blood examination not yet made.

Diagnosis: Paralysis of the right external rectus (sixth nerve), partial paralysis levator palpebrarum and superior rectus and sphincter pupillae (third nerve), probably due to lues.

Case 3.—Miss J. M. Age 34. Graduate nurse. First seen April 8th, 1916, giving the following history: Sixteen years ago her trouble began with headache and pain in the eyes. About the same time, following an attack of scarlet fever, she noticed that with the right eye the right half of the visual field was more distinct than the left. This defect has been present ever since. Lately she has suffered with a return of the headaches, and has noticed a wavering of the vision. Examination shows the vision to be O. D. 5/10; O. S. 5/5—. Under a cycloplegic she accepts O. D. + .25 s. = 5/7—; O. S. — .25 s. combined with a + 3 axis 115 = 5/5—.

The right fundus shows marked atrophy of the nerve head. No other changes manifest. Left fundus normal. Pupils equal, the right one reacting slowly to light. Fields: The right eye shows the nasal field to be lacking. In the left eye the fields are normal.

The following case was shown at the March meeting:

Mrs. S. Age 66. Housewife. First seen March 11th, 1915. In September, 1914, the patient received a severe burn of the right eye from a scale of concentrated lye, which was not removed for three hours. The upper lid, the lower fourth of the cornea, and the lower cul de sac were badly burned. The result was the formation of a symblepharon, with cicatricial bands extending from the nasal half of the lower lid onto the lower fourth of the cornea, almost obliterating the lower cul de sac.

On July 8th, 1915, under cocain anaesthesia, the symblepharon was detached from the cornea and with elevation of the underlying conjunctiva, was carried down to the bottom of an artificial cul de sac, where stitches were carried through and tied externally on the skin surface of the lower lid. The denuded area on the eyeball was now covered by two flaps of the conjunctiva brought down from the upper nasal and temporal sides. Fine silk sutures were used to close the gaps thus made above, and to hold the flaps in place below.

Healing took place rapidly, and the result has been very gratifying.

DISCUSSION.

Dr. Melville Black, of Denver, felt that if the right eye of the Italian recovers at all, it will be with a long drawn-out uveitis. He would, therefore, draw out the iris and cut it off, after first preparing a large conjunctival flap above, so that the latter can be drawn entirely over the cornea and maintained in place for seven or eight days. This will give the corneal wound time to entirely close. He thought the eye would lose all of its vision without an operation, on account of the uveitis, and, that with an operation, some vision may be saved.

Dr. Neeper thought Dr. Black's suggestion was a very good one and it should be put into effect soon.

Dr. Edward Jackson, of Denver, stated that he had seen large iris prolapses flatten down after a number of weeks following a cataract extraction, but that such cases are a source of worry to both the oculist and the patient.

Dr. D. H. Coover, of Denver, stated that he would snip off the prolapsed iris and use Lunar caustic.

Dr. F. R. Spencer, of Boulder, stated that a conjunctival flap would be better than a stitch in the cornea in answering Dr. Wm. C. Bane's inquiry regarding the advisability of a corneal suture.

In closing Dr. Wm. C. Bane stated that the nasal and temporal margins of the wound had closed, but the prolapsed iris had prevented closure of the rest of the corneal wound. He had used sutures to hold the edges of the cornea together.

Dr. Neeper suggested bichloride of mercury for the leucic ptosis.

Dr. Spencer stated that the optic atrophy of the left eye was probably due to an accessory sinus disease following scarlet fever, although it is rather difficult to be absolutely sure of this from the history of the case.

Dr. Boyd, of Denver, presented the two following cases:

Mr. W. Age 25. Mother and a number of mother's family died of tuberculosis. Father died of arteriosclerosis at rather an advanced age. Personal history of bronchitis. Hemorrhage one year ago, accompanying a cold, presumably from the lungs.

The patient is presented because of the marked tortuosity of the retinal arteries; also note the slight pressure upon the globe required to produce pulsation of the arteries on the disc.

This latter is probably explained by the low diastolic pressure.

Under a mydriatic he is hyperopic one diopter. Systolic pressure 125, Diastolic pressure 70 mm.

It is not at all impossible that the tortuosity of the arteries which exists throughout the fundi is due to a state of relaxation, which is claimed to be the earliest indication of sclerotic changes which are to follow subsequently, and yet there is not a condition of general dilation, except that the first and second division are equally as large as the primary vessels.

Mr. R. Age 34. Machinist. In December last was struck in the left eye by a punch and since that time a growth has appeared at the sclero-corneal junction, internally, at site of original injury, which is now 5x4x3 mm.

DISCUSSION.

Dr. W. H. Crisp thought Dr. Boyd's case was one of functional disturbance. Dr. Patterson stated the case was likely due to parental tuberculosis. The patient has a bronchitis, which may be tuberculous, and the patient's mother died from tuberculosis. He feels that such a family history is very important in this type of case and is almost certainly responsible for the functional disturbance. He has had a number of cases which have substantiated this view.

Dr. Jackson stated that as soon as the pressure from the finger equals the diastolic pressure there is produced an arterial pulsation in the retinal vessels. This pulsation is very easy to obtain and, therefore, he wouldn't attach much importance to this symptom, especially in young persons.

Buphthalmos.

Dr. H. R. Stilwill, of Denver, presented a case of buphthalmos of the left eye in a child four years of age. The buphthalmos followed ophthalmia neonatorum. The choroid and sclera showed the most marked stretching above. This case was presented some time ago at a former meeting of this society.

Lime Burn of Eye.

Dr. Wm. H. Crisp, of Denver, re-presented a case of lime burn involving the right eye. This case had been presented two months ago. At the present time (April 15, 1916), it shows an extensive symblepharon above and below. The vision has been reduced to light perception. The superior cul de sac is almost obliterated, although more of the lower remains, so that the movement of the eyeball is very limited.

Dr. Black thought the eye offered a good stump for the prothesis.

Endothelioma of Choroid.

Dr. D. H. Coover, of Denver, reported the following case:

Mrs. L., age 76, consulted me February 26th, 1914, and gave the following history:

Three years ago was struck over the right eye by a picture hook, after this the eye felt full for about one week. For the past seven months notices the vision has been failing in this eye. With glasses the vision was improved somewhat.

July 23rd, 1914, returned complaining of the eye being uncomfortable. Upon examination I found the vision about nil and a detachment of the retina in the upper and nasal side of globe.

On February 28th, 1915, returned complaining of attacks of pain in the eye. These attacks came on at intervals of one or two months. In November, 1915, had an attack of grippe, after which the pain became more severe and would last much longer.

Upon examination found no light perception, lens cataractous, tension plus 3, anterior chamber shallow, the subconjunctival vessels engorged and sclerotic blush over the ciliary region. The iris showed deposits along the root. Advised removal.

March 11th, 1916, removed the eye and found it contained a tumor. The eye was examined by Dr. William C. Finnoff.

Dr. Coover presented the tumor and the following is Dr. Finnoff's report of the pathological examination:

Horizontal section of eye shows a tumor, occupying two-thirds of the eyeball. An area $2\frac{1}{2}$ mm. in the anterior portion is deeply pigmented, but the tumor mass, posterior to the area, has very little pigment. The lens is pushed forward into the anterior chamber, which is shallow. The iris is in contact with the cornea over an area of $1\frac{1}{2}$ mm. from its root.

Microscopic examination reveals a tumor mass, arising from the choroid. Extending from the posterior portion of the ciliary body on one side to 8 mm. from the optic nerve entrance on the other. The tumor cells extend from half of the posterior portion of the lens, backward to the sclera. The retina is detached and pushed forward by the tumor, and its attachment to the optic nerve has been severed.

The deeply pigmented area is made up of large blood channels, resembling choroidal vessels, which are surrounded by large polyhedral cells, which arise directly from the blood spaces. Large masses of dark pigment are seen; the pigment is both intra and extra cellular, and is granular and needle shaped. The blood channels are filled with blood and their walls are made up of tumor cells, only an occasional channel has an unbroken endothelial wall.

Posterior to the pigmented area the tumor cells are free from pigment, and the blood channels are fewer in number and farther apart. The cell nuclei are oval and spindle shaped and the cells are polyhedral. The cells have migrated through the sclera and are seen along the perivascular spaces and also in the tissue which adhered to the globe. The optic nerve has entirely been replaced by tumor cells.

Diagnosis: Endothelioma of choroid.

Dr. Neeper reported a case of an elderly man, age 72, with extensive pyorrhea alveolaris. He complained of failing vision, which was found to be 5/80. This was improved to 5/40 after extracting teeth.

Optic Atrophy Resulting from Fronto-Orbital Abscess.

Dr. Libby reported a youth of eighteen with orbital cellulitis, lid edema, intense conjunctival congestion and marked exophthalmos of the left eye, seen in consultation with Drs. W. H. Bergtold, W. J. Le Rossignol and E. W. Collins. Two weeks before this examination fronto-ethmoiditis developed following active exercise and swimming in a gymnasium pool. The boy then went to his home in the country.

Orbital abscess supervened, pointing just above the inner fourth of the left eyebrow, under the periosteum. There was also a discharging fistula back of the incisor teeth in the hard palate. The orbital abscess was promptly incised by Dr. H. R. Bull and was discharging creamy pus through a fistulous tract. The fever was high, pain great, and the patient was collapsed, with mentality sluggish. The eye was totally blind. The ophthalmoscopic picture was that of destruction of the central vessels, due evidently to compression. Dr. Collins used suction frequently for many days to promote drainage externally, together with intranasal treatment, while Dr. Bergtold gave general treatment. An autogenous vaccine was administered every five days by Dr. Collins. The pus formation ceased, the

fistulae closed, the eye resumed a normal appearance and the patient regained his customary good health. Five weeks after the first ophthalmoscopic examination, the media of the left eye were clear, and there were optic and retinal atrophy and degenerative changes in the macular region. The retinal veins were then much shrunken, while many of the arteries were threadlike. Early and appropriate intranasal treatment might have saved this eye and avoided the severe and dangerous constitutional disturbance.

Hyalitis Secondary to Accessory Sinus Disease.

Dr. G. F. Libby also reported a woman of thirty-six, who had complained of attacks of blindness occurring once a month in the right eye, lasting from a few minutes to a half hour; also a small floating cloud before this eye. Corrected vision equals R. 5/6, L. 5/5. The ophthalmoscope showed: R., floating vitreous plaque above, with central dust-like opacities; L., media clear and fundus normal. The patient stated that she was "rather run down." Re-examination sixteen months later revealed no change in the vitreous, the refraction or the vision. The attacks of transient blindness no longer occurred, but the floating opacity was still noticed. Three months later the vision of the right eye was suddenly lost. The patient was seen by Dr. C. E. Walker and by him referred to Dr. T. J. Gallaher for rhinological examination and treatment.

Dr. Gallaher gave the following report: "Nasal septum deflected to the right, bilateral hyperplastic ethmoiditis, bilateral sphenoiditis with slight pus discharge. Pulsation in both sphenoids discernible by use of the rhino-pharyngoscope. The following operations were immediately performed: First, exenteration of the left ethmoid cells and cutting down the anterior wall of the sphenoid on the left side. Second, an extensive septal submucous resection. Third, exenteration of the ethmoid cells and removal of the anterior wall of the sphenoid on the right side. It is to be noted that operation on the left sphenoid was immediately followed by improvement in vision of the right eye. As demonstrated by Onodi and others, diseases of the sphenoid sinus and posterior ethmoid cells may affect the opposite eye. Therefore, whether one or both eyes are involved, it is necessary for the rhinologist to carefully examine the sphenoids and ethmoids of both sides in relation to either or both eyes. After the third operation vision rose to ability to read the newspaper with the right eye."

The case then came under the care of Dr. Libby and Dr. H. E. McCollum, the family physician. Under courses of K. I. internally and dionin instillations the vision gradually rose to $\frac{5}{8}$ in two more years, and the vitreous showed only several thin floating plaques and dust-like opacities. This improvement held one year later, when the patient was last seen. Dr. Libby stated that he reported this case not only to point out that the source of the hyalitis was intranasal and to show the necessity of prompt and radical rhinologic work, but to raise the question of the diagnostic significance of vitreous opacities.

Dr. Melville Black presented three cases and reported a fourth as follows:

Case 1.—Young man seen several years ago with neuroretinitis. Later a massive exudate developed in the fundus of the left eye, so that there was distinct elevation of the posterior portion. The elevation amounted to six or seven diopters. Later O. D. became involved and has passed through almost the same identical stages. The macular region of each eye is decidedly blurred. A diagnosis of tuberculosis of the retinal vessels was made and, after being seen in consultation with Dr. Edward Jackson, tuberculin was administered beginning with small doses and gradually increasing until he responded by a local, a general and a focal reaction. He was given small doses of tuberculin for months, but without material improvement. Later Cary's treatment with iodine was used, but, in spite of everything which could be done, retinitis proliferans subsequently developed. At the present time he has almost no vision left in either eye.

Case 2.—An old gentleman, about 75 years of age, who suffered an injury of one eye in 1874. In 1894 a corneal ulcer developed which perforated and left an adherent leucoma. Recently this eye was injured again, so that when he came to the clinic there was marked pericorneal inflammation, hypopyon and *ulcus serpens*. The pneumococcus was demonstrated in swabs and cultures from the ulcer. Cyanide of mercury, 1-1500, was injected subconjunctivally and ethylhydrocuprein hydrochloride used. Secondary glaucoma developed and, as the ulceration was so extensive, a Saemisch incision was made with liberation of the pus in the anterior chamber. The wound had to be probed daily to keep it open and liberate the pus. Pasteurization, in accordance with Prince's method, was used,

so that, at the present time, the cornea is clearing, especially in the superior portion.

Case 3.—Young man, age 28. Moulder by occupation. Hot metal flew into the right eye twelve years ago, producing a severe burn between the inner canthus and the inner limbus. At the present time he has a large and very vascular pterygium extending from the inner canthus of O. D. to beyond the inner limbus. This was obscured near the limbus by a light gray cyst measuring about $4 \times 4\frac{1}{4}$ mm. in size and filled with light yellow serous fluid. Dr. Black dissected out the cyst, under cocaine anaesthesia, and transplanted the pterygium below by McReynold's method.

Case 4.—Dr. Black exhibited a calcareous lens and choroid in an enucleated atrophic eyeball. The lens was almost perfect in size and shape, but was a dirty yellow color and of stone-like hardness.

Dr. F. R. Spencer, of Boulder, presented the two following cases:

Mr. G. C. R., age 20, student, first examined February 28th, 1916. He gave the following history: Has been having almost constant headache recently, with inability to see one-half of any object with the left eye.

V. O. D. 15/10—1 and J. No. 1; V. O. S. 1/200 and not even J. No. 14. The anterior segment of each eye was negative. Keratometer: O. D. 1.00 D. 90 plus 180—; O. S. 1.00 D. 75 plus 165—.

Under a cycloplegic (Hyoseyamin) V. O. D. 15/100 equals 15/10 with a plus 2.00 combined with a plus 0.25 axis 90; V. O. S. 15/200— equals 15/200 with a plus 1.00 combined with a plus 0.25 axis 75.

The right fundus was negative, but the left showed a narrow myopic crescent on the temporal side of the disc and a disease of the macula about one disc diameter in size with the white sclera showing through the atrophic choroid and retina. There was some pigment in the periphery of this area.

Diagnosis: Congenital defect of choroid and retina, probably due to intrauterine disease.

When patient is questioned closely, he admits that vision in the left eye has been defective for at least seven or eight years. (Patient has chronic pansinitis with muco-purulent discharge and very definite involvement of the right frontal

and right anterior ethmoidal cells, although I don't believe this is in any way responsible for the left fundus disease.)

Case 2.—Mrs. H. R. M., age 54, widow, first examined January 17th, 1916. She gave the following history: About nine years ago the right eye became inflamed and painful, and the sight failed rapidly, so that in a few weeks' time she was unable to see even very large objects with this eye. She did not consult a physician and nothing was done to restore the vision. Six weeks ago the left eye became inflamed and painful with rapid loss of vision. She consulted a physician, who evidently made a diagnosis of iritis, as he prescribed atropine, and reassured her that as soon as the inflammation left he would fit her with lenses and she would see perfectly with the left eye.

The examination revealed the following: V. O. D. not even light perception in the dark room; V. O. S. 1/100. Patient was unable to read even the very coarsest Jaeger test type with O. S. O. D. showed pronounced superficial and deep pericorneal injection; the pupil was 8 to 10 mm. in diameter and reacted neither to light nor accommodation; the iris was dirty grayish brown in color; the anterior chamber was shallow and the tension was plus 3. O. S. showed almost the same identical condition as O. D.

The ophthalmoscopic examination revealed the following: O. D. absence of red fundus reflex; hypermature cataract with almost glistening white hypertrophic anterior lens capsule and the lens was tremulous. O. S. cornea steamy; lens and vitreous slightly hazy with quite a definite diffuse opacity in the lower part of the lens and an opacity of less distinctness in the entire periphery; definite glaucomatous excavation of the disc with eight to ten areas of hemorrhage from one to three millimeters in diameter scattered over the fundus.

Diagnosis: Absolute glaucoma each eye.

A trephining operation was advised and performed the following day at the lower sclero-corneal margin, according to Elliot's technique. The lower limbus was selected because her eyes persistently turned up, in spite of her efforts to turn them down, as is so apt to be the case in eyes which are blind or nearly so. A small peripheral iridectomy was performed in each eye.

Healing of the wound was uneventful and the tension gradually became lower. March 14th it was 42 mm. O. D. and 23 mm. O. S. by Gradle's tonometer. This afternoon the ten-

sion was 42 mm. O. D. and 37 mm. O. S. The right eye has evidently been glaucomatous too long for the tension to become normal, but the left eye, so far, promises more improvement. V. O. D. has not improved, nor was it expected that it would, but V. O. S. has improved so that she can recognize coarse objects, such as articles of furniture, the alley fence in her daughter's back yard, where she walks daily, and the rosy cheeks of her grandchildren.

DISCUSSION.

Dr. Crisp stated that a Denver physician has a similar macular lesion to that of case one.

Dr. Libby said he would not remove the left cataractous lens from the case with glaucoma, as he felt it best to let well enough alone for the present, at least.

Dr. Patterson suggested that the macular disease might be due to maternal strain at labor or to a forceps delivery.

Dr. Black expressed the same opinion. He suggested the possibility of tuberculosis in the first case. He wouldn't do a cataract operation on the left eye in the second case, but he would resort to massage in order to lower the tension.

Dr. Jackson stated that hemorrhage is frequent at birth and is very likely responsible for the macular disease. He thought tuberculosis less likely, although he felt the disease must have been of an inflammatory nature.

FRANK R. SPENCER,
Secretary, Boulder, Colorado.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Annual Congress.

The Annual Congress of the Society was held on the 4th, 5th and 6th of May, under the presidency of Mr. Walter H. Jessop, F.R.C.S. The discussions took place at the Home of the Royal Society of Medicine, and the clinical meeting at the Central London Ophthalmic Hospital, Judd Street.

Presidential Address

The president, in the course of his opening address, referred with pride to the fact that the Society was now presenting its 36th consecutive annual volume of Transactions. The Bowman Library was the finest and most complete Ophthalmological library in the world, and he asked members

to co-operate in keeping it supplied with literature of special interest to their department. This year the Society was made poorer by the death of two brilliant workers: Mr. George Coats, of London, and Professor Straub, of Amsterdam. A special tribute was due to the first named for the great help he had rendered to the Society, especially in its troublous times three years ago. Mr. Jessop devoted the chief part of his address to the subject of some ophthalmic lessons of the war. Thanks to the efforts of Colonel Lister and others, the treatment of cases of eye injury had been good. He, the speaker, had, as yet, found no cases of sympathetic ophthalmitis, which happy fact was due to the precaution of removing every portion of a smashed and broken eye. In the war of 1870, sympathetic eye trouble was reported in 55.6% of cases of severe eye injury. This war had taught ophthalmic surgeons much on the subject of papilloedema, a question which had been patiently worked at by Mr. Leslie Paton and Dr. Gordon Holmes. He proceeded to refer to trench nephritis and the eye changes found in association with it. He regarded it as a toxic condition, and referred to the occurrence of oedema of the retina, ocular haemorrhages, and the formation of white plaques. In the worst instances, the blood pressure was high, but it varied much in different cases. In encouraging younger ophthalmologists to accurate observation, he laid stress on the importance of daylight examination.

On the motion of Sir Anderson Critchett, the President was cordially thanked for his address.

Mr. J. Herbert Fisher read a paper on "Leber's disease (hereditary optic atrophy)": a suggestion as to its cause. He suggested that the causal agent might be a disturbance of the pituitary body, of temporary duration, and moderate in degree, implicating the visual pathway. If his view were correct, organo-therapy ought to be beneficial. During pregnancy the pituitary gland might enlarge to two or three times the normal, and there was a close relationship between the pituitary and sexual glands. Moreover, the pituitary and optic chiasma were in such close contiguity that any small swelling of the former would extend to and make itself felt in the latter. He exhibited a skiagram showing a honey-comb-like shadow in the situation of the pituitary.

The paper was discussed by Sir George Berry, Dr. G.

Mackay, Dr. S. A. K. Wilson, Mr. Stack, Mr. Stephen Mayou, and Dr. C. O. Hawthorne.

Mr. Foster Moore contributed a paper on "The Retinal Circulation in Arterio-Sclerosis." He agreed with Priestley Smith that a high pressure in accessible arteries in elderly men did not necessarily mean high pressure in the ciliary capillaries. A sudden obstruction of circulation due to thrombosis in an artery might lead to relative starvation of tissues, and the patient might awake to find himself blind. Sometimes there was an equally rapid recovery of vision. It was not necessary to evoke spasm of the artery as a cause.

Dr. S. A. K. Wilson read a paper on "Dysmetropsia," meaning thereby a defect in the capacity to appreciate the size and distance of objects. He divided the cases into (a) those in which the lesion was presumably peripheral, (b) those in which it was probably central, (c) psychical cases. In an instance of the latter, the young woman, who was the subject of hysteria, always saw the right half of objects much larger than the left: and if two shillings were placed side by side, she considered that the right hand one was half-a-crown. In a case of occipito-parietal tumour, the objects looked at seemed so near that they appeared to be practically touching the observer's face. Dr. Wilson considered that in judging of distances and sizes of objects we learn more from the retina than from so-called kinaesthetic impressions.

Mr. M. Hine recorded some observations with the Schiötz tomometer, as a result of which he was of opinion that eserine produced no injury, although many of the cases observed were in children: and that it definitely reduced intraocular tension, a view shared by a number of workers who had recorded their observations.

Mr. E. Treacher Collins read a paper on "Contusion Hypotony." He said that diminution of tension after contusion of the eye, apart from perforation of the globe, was not infrequent. In most cases, normal tension was restored in a few days: in others not for several weeks, and in some it remained so long as to be likely to be permanent. The causes he discussed under the following heads:

(1) Diminished secretion, cases being divisible into (a) from nerve inhibition, (b) from vascular disturbance, (c) from epithelial damage.

(2) Increased excretion, namely, (a) through normal channels, (b) through newly-formed channels. He submitted the following conclusions:

1. Hypotony following contusion of the eyeball may be due to different causes, more than one of which may be present at the same time.

2. When of short duration it is probably due to an increased rate of excretion of the intraocular fluid through the expanded normal channels of exit, or, possibly, to some arrest of secretion, from paresis of the vaso-constrictor nerves.

3. When of long duration, it may be due to (a) the formation of new channels of exit for the intraocular fluid from the anterior chamber, from either an internal scleral rupture, or rupture of the pectinate ligament: (b) the cutting off of blood supply to the ciliary body from rupture of the anterior ciliary arteries, or (c) possibly the detachment of the pars ciliaris retinae.

4. If accompanied by extensive haemorrhage into the anterior chamber, either the canal of Schlemm has been opened up by an internal scleral puncture, or the anterior ciliary arteries have been torn across from cyclodialysis.

5. If, when the blood has been cleared away, a portion of the iris has disappeared from view, as though an iridectomy had been done, then there has been cyclodialysis with rupture of the anterior ciliary arteries.

6. If, in the course of time, a translucent area appears just outside the sclero-corneal margin, like that seen in cystoid cicatrix, then there has been an incomplete internal rupture.

7. If the anterior chamber, without extensive haemorrhage into it, becomes markedly deepened in the whole or part of its circumference, there has probably been a rupture of the ligamentum pectinatum, limited to the pillars of the iris, and of the ciliary muscle, prolonging the angle of the anterior chamber outwards.

8. If the lens is dislocated laterally and the retina detached, the vitreous humour has probably come forwards into the circumlental space, and may have dragged the pars ciliaris retinae away from the pigment epithelium.

Mr. A. L. Whitehead (Leeds) and Mr. J. Herbert Parsons (London) introduced a discussion on "Foreign Bodies in the Eye and Orbit."

Mr. Whitehead referred to the frequency with which the eyeball was penetrated by foreign substances in industrial centres. Sometimes the particle passed completely through the globe, and the war had demonstrated the extraordinary penetrating power of metals when propelled by high explosives. He enumerated the various forms of eye injury, and said that the prognosis and treatment of an eye containing a foreign body must depend on a variety of factors, such as the introduction of septic organisms with the foreign body, the size of the substance, the site and depth of penetration, the nature of the substance. Copper, unless embedded in the lens, always set up localised suppuration, with necrosis of tissue, and, if in the vitreous, phthisis bulbi. He discussed X-ray localisation, and the extraction of steel and iron by the electro-magnet. If steel were in the vitreous, he made a conjunctival flap, punctured the sclerotic behind the ciliary region, and inserted the point of the giant magnet, keeping the current on during withdrawal. In his hospital, the onset of sympathetic irido-cyclitis secondary to retention of a foreign body inside the exciting eye was not common. An injured eye without useful vision should be enucleated if there was even a suspicion of the presence in it of a foreign body. If a foreign substance were not causing pain or discomfort, it should be left alone.

Mr. Parsons discussed the anatomical relations of the eyeball to the orbit, and urged a more accurate study of the relations of the living eye to the bones, which could be done by the insertion of slips of lead foil in the cocainised conjunctival sac. The eye was least protected against missiles coming from a direction downwards and outwards. Despite the heat generated in a high-velocity missile, the particles entering the eye were not always sterile. The diagnosis, pathological condition, treatment and prognosis all depended profoundly on the nature of the foreign body. When the substance could not be seen in the eye, skiagraphy must be employed, but this had its severe limitations. He regarded accurate localisation as most important. If this were not done within 1 mm. of the truth it might mean the needless sacrifice of the eye. Only rarely did a copper particle become encapsulated, with restoration of useful vision. He discussed at some length the production of siderosis bulbi. Glass and porcelain might cause remarkably little reaction in the eye, but eventually the eye became disorganized following iridocyclitis. The lens substance and the

vitreous formed excellent culture media. The ultimate results of extraction of intraocular foreign bodies by the electromagnet were of profound importance, and had not yet received their due attention. In conclusion, he alluded to the different operative measures, according to the class of case, and the prognosis in them.

There was a very instructive discussion, and the authors replied.

A debate on "The Treatment of the Syphilitic Eye Affections by the Newer Methods," was introduced by Mr. J. B. Lawford and Captain H. S. Browning.

Mr. Lawford opened with a historical review of the subject. When salvarsan was introduced, sleeping sickness had already been treated by Atoxyl, and, in spite of the cases of blindness which followed its use, it was extensively prescribed for patients suffering from ocular syphilis. The frequency of occurrence of nerve atrophy afterwards, however, soon led to the abandonment of those drugs. Salvarsan was a much less dangerous arsenic compound. He suggested that as there was now a very general agreement as to the value and efficiency of salvarsan therapy in ocular lesions in the early periods of syphilis—primary, secondary, and early tertiary stages (i. e., chancre of eyelids, iritis, cyclitis, etc.), a discussion on this aspect from the clinical side would not be very helpful. Much difference of opinion, however, existed as to the efficacy of salvarsan in some of the later manifestations, and on this side discussion would be valuable. He spoke of the use of salvarsan in oculo-motor paralysis, ophthalmoplegia interna, and optic nerve atrophy of late syphilis, and in congenital keratitis, and quoted cases, both from his own experience and the published records. He concluded with a brief reference to the reputed noxious effects of salvarsan and neo-salvarsan upon the optic and other ocular nerves, and said most observers were agreed that the complications met with after the use of these drugs were really fresh manifestations of the syphilitic virus, and its continued employment resulted in their amelioration, differing therein from the nerve lesions following the use of Atoxyl. He believed there was no evidence that syphilis could be eradicated by salvarsan treatment alone: prolonged employment of the classical remedies was essential for a cure, even when the results from the arsenic compounds seemed to be brilliant.

Captain Browning dealt first with the diagnosis of the

disease, which was too frequently based on clinical evidence alone. All aids to diagnosis should, however, be employed. It was not true that all cases of choroiditis were syphilitic in origin. In every suspected case of ocular syphilis, a careful examination of the whole body should be made, and the lesions examined with the dark-ground condenser. He preferred the original Wassermann test for ordinary purposes, and he considered it one of the most reliable serological tests. A negative Wassermann, however, did not mean that the patient had not got syphilis. Repeated doses of arsenical preparations, combined with mercurial treatment were needed to bring about a cure. He spoke of the value of the various drugs for the disease, and their dosage and methods of administration. Kharsivan and Neokharsivan were more toxic than salvarsan, and there were more unpleasant symptoms after them. He was not encouraged by his trials of Intramine and Ferrivine to continue their use.

The debate which became general, revealed a strong agreement with Captain Browning's contentions.

On Friday afternoon the Society examined and discussed a large series of cases of special interest at the Central London Ophthalmic Hospital, Judd Street.

On Saturday, Major Cunningham, Professor De Laperonne, and Colonel Lister discussed war injuries to the eyes. The last-named said that in the case of foreign bodies in the eye, so long as there was no prolapse of uvea or lens capsule, there seemed to be no danger in keeping that eye. The lens had been frequently injured in the war. The absence of cases of sympathetic ophthalmia from the war was extraordinarily satisfactory. For cases of prolapse of the uvea, he submitted a new operation, and emphasized the importance of avoiding tension, if necessary by making a counter-puncture. If an eye containing a foreign body did not quiet down, their practice in France was to remove the eye. But if it did become quiet, the eye was left in for colleagues in England to treat and watch it. He invited criticism from ophthalmologists in this country of the work in France in eye cases, so that workers in the war area might have the benefit of such suggestions.

The following papers were read:

Dr. C. O. Hawthorne: "Retinal Changes in Glycosuria."

Captain A. W. Ormond: "Treatment of Large Traumatic Haemorrhages in the Vitreous."

Mr. J. Gray Clegg: Spontaneous Intraocular Haemorrhages.

Captain Beatson Hird: "Notes on a Case of Tumour of the Retina." The case was regarded as unique, and was referred, with specimens, to a pathological committee to report upon it.

Editor, THE OPHTHALMIC RECORD:

Sir: I should be much obliged if you will kindly insert in your JOURNAL the following preliminary note on a new method of colouring the eye ball in cases of corneal opacity where no sight can be restored. This is done by separating the conjunctiva all round at the corneo-scleral junction, undermining it and then stitching the margins in front of the cornea so as to completely cover it. An artificial pterygium covering the whole of the front of the eye ball is thus formed. Lamp black obtained by burning a castor oil lamp and collecting the deposit called "Kajal" in Urdu is then tattooed into the conjunctiva or an emulsion of lamp black injected subconjunctivally or placed over the opacity first and the conjunctiva stitched. This method is specially useful in cases where the cornea has sloughed off and the opacity is on the iris as in anterior staphyloma after prolapse of the iris.

No wound is made in the eye ball itself hence there is no danger of infection to the eye or of sympathetic ophthalmia. If a repetition is ever necessary it can easily be done without the patient remaining in hospital or having any after treatment. The colour is much more evenly distributed than in ordinary tattooing of the cornea. After a time leucocytes carry the pigment deeply into the conjunctival and subconjunctival tissues and infiltrate them with it. The conjunctiva is a translucent structure and the pigment shines through it just as clearly as the white of the sclerotic is seen through it.

In case of large anterior staphylomata the staphyloma may be excised by de Wecker's method as described by Colonel Maynard in his Manual of Ophthalmic Operations or after the staphyloma has been excised, the cut margin of the sclerotic may be brought together and stitched up with catgut and the conjunctiva can then be stitched in front of it. I do not think that stitching the sclerotic increases the danger of sympathetic ophthalmia.

The sclerotic will give better protection to the uveal tract

than either the cornea or the staphyloma, which is after all only exposed iris with a white scar on it hence subsequent danger of sympathetic ophthalmia in the sound eye is less. The colour deepens as time goes on, as the conjunctiva gets more and more adherent, the redness passes off and the transparency of conjunctiva is again restored. Pigmentation lasts much longer than it does after tattooing the cornea.

HARI SHANKER, I. M. S.,

Assistant Surgeon, Eye Dept., Civil Hospital, Delhi, India.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

One prosecution is reported in Illinois for violation of the law in regard to reporting ophthalmia neonatorum.

Mr. Wm. Lang of London, is president of the section on ophthalmology of the Royal Society of Medicine, England.

Dr. Wendell Reber of Philadelphia is ophthalmic expert on the Upson Foundation for the study of dental disorders in connection with general disease.

Dr. James J. Mills of Johns Hopkins University has sailed for France where he will serve as ophthalmologist to the municipality of Biarritz for a few months.

The Hungarian Ophthalmological Society held a special meeting in Budapest on June 11 to consider eye topics related to the war.

Dr. D. M. Lindsay of Salt Lake has been compelled to go to Europe twice during the past year to look after his son who has been wounded while serving in the war.

The medical world, including ophthalmology, suffered a loss in the recent death of Sir Victor Horsley, the eminent English surgeon, who died recently at the age of 59.

Mr. Sydney Stephenson of London is president of section for the study of diseases of children of the Royal Society of Medicine, England.

Mr. John B. Story has been elected vice-president of the Royal College of Surgeons of Ireland, and appointed Honorary Surgeon Oculist to his Majesty the King in Ireland.

The following deaths of ophthalmologists are announced:

Dr. Julius H. Woodward of New York, aged 58.

Dr. Charles F. Nolen of Baltimore, aged 47.

Dr. Louis Verrey of Lausanne, Switzerland, aged 61.

Dr. L. Assicot of Renne, France, aged 42.

Dr. Edward Fitzgerald of Dublin, aged 73.

Dr. Ole Bull of Christiana, aged 73.

Dr. Paul H. Romer, who died of typhus fever while serving in the German army on the eastern front.

Dr. John J. Corrigan of Pawtucket, R. I., aged 59.

Dr. Henry Horlbeck of Columbia, S. C., aged 43.

Dr. Benjamin Wolff of New York, aged 42.

The following notice is issued by the University of Minnesota:

"A fellowship in Ophthalmology and Oto-Laryngology at the University of Minnesota will be vacant this fall. This fellowship consists of a course covering a period of three years, which is in preparation for this specialty. At the expiration of the course, if the work performed is satisfactory the degree of Doctor of Science (in Ophthalmology or Oto-Laryngology) is granted. The fellow serves as an assistant in the clinic and hospital, and pursues a course of study including laboratory work. The fellowship pays \$500.00 the first year, \$750.00 the second and \$1000.00 the third year. Applications and inquiries may be made to the head of the department, Dr. Frank C. Todd, Minneapolis, Minnesota."

Wanted. To purchase back numbers of American, English, or German Ophthalmic Journals. Dr. C. A. Bahn, Cusachs Bldg., New Orleans, La.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Patillo (P.G.) G. W. Mahoney (Pol.) R. B. Stephenson (P.G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suker (P.G.) C. H. Francis (Pol.) H. N. Lyon (P.G.) A. G. Wippen (E.E.N.T.)	W. F. Coleman (P.G.) S. M. Hager (Pol.) H. N. Lyon (P.G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Pol.) Richard S. Patillo (P.G.) R. B. Stephenson (P.G.) A. G. Wippen (E.E.N.T.)	C. H. Francis (Pol.) R. B. Stephenson (P.G.) J. A. Cavannah (E. E. N. T.) A. G. Wippen (E.E.N.T.)	S. M. Hager (Pol.) C. W. Hawley (P.G.) H. N. Morlan (P.G.) A. G. Wippen (E.E.N.T.)
10 A.M.	Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A.M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.) Harry Gradle (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.) Harry Gradle (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. W. Eiss (Inf.) R. Crossley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) S. L. McGreigh (C.C.S.) Robt. Von der Heydt (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. W. Eiss (Inf.) R. Crossley (Inf.) C. C. Clement (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. W. Eiss (Inf.) R. Crossley (Inf.) C. C. Clement (Inf.) S. L. McGreigh (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) J. R. Loring (Inf.) S. L. McGreigh (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenhoe (Inf.) D. W. Eiss (Inf.) R. Crossley (Inf.) C. C. Clement (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McGreigh (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) Oliver Tydings (E. E. N. T.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.G.) H. N. Lyon (P.G.) 2-5	C. W. Hawley (P.G.) 2-5 J. F. Campbell (P.G.) G. F. Suker (P.G.) H. J. Morlan (P.G.)	L. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.G.) 2-5 H. Cuthbertson (P.G.)	C. W. Hawley (P.G.) J. F. Campbell (P.G.) H. J. Morlan (P.G.)	W. F. Coleman (P.G.) 2-5 H. N. Lyon (P.G.)	Rush: Rush Medical College, W. Harrison and Wood Streets. St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue. U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

ABBREVIATIONS:

*Special operative eye clinic.

County: Cook County Hospital, W. Pol.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.
Harrison and Honor Streets.
Inf.: Illinois Charitable Eye and Ear P.G.: Post-Graduate Medical School
Infirmary, Peoria and Adams Streets, of Chicago, 2400 Dearborn Street.
M. H.: Mercy Hospital. N. W. U.: Northwestern University, 2431 Dearborn Street.

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GLAUCOMA SIMPLEX AND THE "MULE SHOE" DRAIN.

BY

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SPRINGFIELD, ILL.

The consensus of opinion, so far as I could ascertain it, that no operation for Glaucoma was entirely satisfactory, led me to report at the meeting of the Denver Ophthalmological Congress in July 1915 my experience resulting from the introduction of a gold drain in seven glaucomatous eyes.

My report was published in the January number of the *Annals of Ophthalmology*. At the time of publication the number of cases had reached nineteen. The conclusions drawn were as follows:

"Trepphine openings fail to drain from three causes:

(a) They may be plugged by a clot of coagulated aqueous humor.

(b) They may be obstructed by organized exudate.

(c) They may be blocked by the accumulation of epithelium.

A thread seton has physical objections which make it take a second place in comparison with gold; biologic objections which make the wisdom of using it questionable in the drainage of the aqueous humor.

Gold is preferred for the following reasons:

It is not resented by the tissues.

Does not gather residual germs.

May be rendered so thin that its presence is unnoticed.

Will prevent the lips of the wound from adhering.

Will probably insure permanent drainage.

A gold ring with a solid toe serves better than a plate, which is found to cut out.

The traumatism resulting from the making of flaps in the execution of the trephine operation may be reduced to a minimum by making the incision in the conjunctiva parallel and 6 mm. removed from the corneal margin, which incision posses-

ses the advantage that it may be closed by a so-called "overcast" suture, the friction of which alone holds the edges together for a sufficient length of time to secure union without the use of knots."

My observations have now extended to thirty-three cases and the uniformity of the results leads me to consider myself justified in offering the following comments in the hope that they will appeal to the common sense of the reader, and that others may feel justified in giving these usually discouraged patients the benefit of a trial, particularly in cases which offer little encouragement from any of the usual procedures.

Description of the Operation.

The operation is usually performed under local anaesthesia following an injection of morph. sulph. gr. $\frac{1}{4}$, scopolamin, gr. $\frac{1}{100}$.

The antiseptic employed is mercuric biniodide 1/2000.

The superior rectus is grasped by a special forceps (Fig. A)

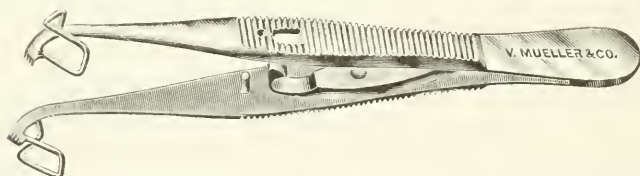


Fig. A. "Rectus Eye Control." Simultaneously depresses the cornea and depresses the upper lid.

by which the lid is elevated and held in that position throughout the operation. The conjunctival incision is made parallel and 6 mm. removed from the limbus, which it does not approximate at any point.

The lower lip of the incision is now grasped with toothless forceps and separated by scissors down to the limbus. The capsule of Tenon is also incised to permit infiltration into the subcapsular space.

The loosened conjunctiva is now drawn over the cornea and undercut with dissecting keratome to expose the limbus.

A shoulder trephine is placed exactly over the limbus. The object of this procedure is to get a clean cut $1\frac{1}{2}$ mm. in diameter so that, upon the removal of the trephine, the button of sclera and also the iris will be projected out of the opening. Should the trephine not cut out the button it is dissected out by the point of a very sharp cataract knife.

An iridectomy is now made in the usual manner.

The drain is now grasped by a "jewelers" pliers and shaped so that the toe is at right angles to the ring. The wire constituting the ring is so delicate that it easily gets out of shape, therefore requiring attention the last thing before insertion. The toe is made to rest vertically in the trephine opening while the position of the ring conforms to the surface of the sclera.

The conjunctiva is now replaced in position over the drain. A conjunctival overcast suture is inserted as shown in the cut. In practice the suture is usually inserted and left loose, the drain is inserted and the ends of the suture drawn tight as the final step. The eye is kept closed and bandaged for three days to permit a clot to fill the trephine opening and hold the drain in position.

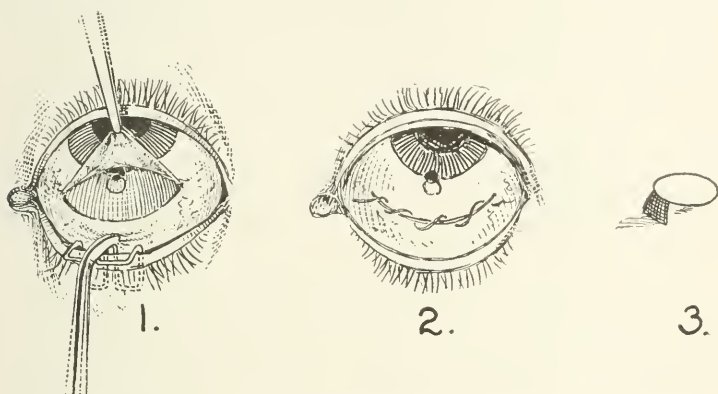


Figure B.

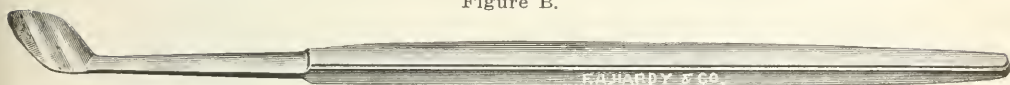
Figure C.
Dissecting Keratome.Figure D.
Trephine.

Fig. B-1. Cut No. 1. Showing incision with drain in situ.

Fig. B-2. Cut No. 2. Showing method of suturing incision.

Fig. B-3. Cut No. 3. Showing drain.

Fig. C. Cut of dissecting Keratome.

Fig. D. Cut of shoulder trephine.

Fig. A. Cut of fixation lid elevator.

Evolution of the "Mule Shoe" Drain.

The drain was originally made in the shape of a horse shoe. It was found advantageous to unite the heels of the shoe, after which a patient suggested the resemblance to the mule shoe, which consists of a ring surmounting a projecting toe; hence its name.

A variety of shapes and sizes were tried out in my kennel, and the eyes removed after various intervals to ascertain if there was any evidence of the presence of the drain being resented. None was found.

Originally the toe consisted of a loop of the wire. It was found that the infiltration had a tendency to lift the toe out of the opening. By shaping the toe to resemble a key-stone this result was overcome. Subsequently a solid gold toe was substituted. (Fig. D-4.)

The circular ring by which the toe was prevented from penetrating deeper into the eye was originally made from the

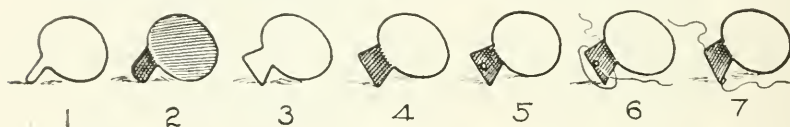


Fig. D. Showing Evolution of Drain.

smallest wire obtainable, which was 20/1000 of an inch in diameter.

The presence of the ring, resting under the conjunctiva, caused no discomfort, (one of these wires has been worn eighteen months) but it was found that in some cases there was a slight ptosis, and also a tendency to cause the conjunctiva to be absorbed over the wire, thus exposing the wire. This was overcome by having a special tool made by which the wire was drawn down to 6/1000 of an inch. Since this change was made no tendency to cut out has been found.

Nos. 5-6-7 represent some special types of drain which have been made to satisfy the thought that the use of a thread would be an auxiliary advantage. For obvious reasons they have not been tested out by the author. (Fig. D-1.)

No 4, with a solid toe represents the type of choice.

Toleration.

To most minds the idea of leaving a metal drain permanently in the eye is at least a surprise. The first thought is that it acts as an irritating foreign body. On second thought

one realizes that an antiseptic foreign body is usually tolerated, even in the brain.

In the case of a metallic drain in the eye it is observed to cause no reaction and except for the explanation the patient would have no knowledge of its presence.

The first case in which it was used was that of a man who had great pain and a hazy cornea. He wore the drain with the thick wire under the conjunctiva for several months, with absolutely no discomfort. The drain was ultimately removed on account of cutting through the conjunctiva. He has had no return of trouble.

In the second case the early type of drain with thick wire was introduced in April 1915. It is still doing service and has not given a moment's pain. I can give assurance that the presence of the drain has not served to cause pain or irritation in a single case. This much has been established.

Visibility.

For the first week or two the drainage is quite free and the conjunctiva is slightly elevated for some distance about the opening. During this period the wire is often invisible, not from injection, but because of the oedema.

Later on the ocular wire becomes quite apparent by supporting the lid and directing the eye downward.

In only one case out of thirty-three has there been anything to render the key-stone portion visible in the anterior chamber. It does not project much beyond the membrane of Descemet and does not show. In the one exceptional case a little coagulated exudate can be seen at the point where the key-stone penetrates the anterior chamber. This was watched several months and did not increase or decrease.

Permanency of Drainage.

The length of time during which the most of these drains have been worn is still too short to justify a positive expression of opinion, regarding the permanency of drainage. So far as my experience would enable me to judge the permanency of drainage is satisfactory. In my former experience with other methods I have been so often disappointed as to lead me to be very cautious in making a prognosis. When the Elliot operation came I thought we could be more optimistic. In this I was disappointed on account of the frequent occurrences of failure in cases which seemed at the start to be satisfactory. Thus far my prognosis has been guarded. I have explained to the patient

that the new method conforms to the principles of physics and appeals to reason, but have advised the suppression of elation until many months have passed. I have made no effort to select cases: have taken everything that came, and have been very much surprised, especially in cases of old blind eyes to observe the presence of satisfactory compressibility months after the operation.

It has been very gratifying to follow cases which presented conditions which would have justified an evisceration or an enucleation, and seen them month after month giving indications of restored drainage.

In but one case have I failed to see a lowering of the tension, and that was a case in which I did not make a trephine opening, but made a straight incision with a Graefe Knife, and introduced the key-stone toe between the lips of the wound. In the healing the edges closed about the key-stone and the drainage was cut off. I prescribed massage with the fingers on the lids and drainage improved, but ultimately required a second drain which was introduced through a trephine opening. This case leads me to recommend the employment of the trephine opening, rather than a vertical incision into the anterior chamber at the limbus. (Case Mrs. S.)

The making of the trephine opening is little more difficult, and has advantages of its own over all the operations by linear incision.

Censure.

In the making of thirty-three operations for chronic glaucoma, especially by a new method, one may expect censure. We may get blamed when we do not deserve it, and undeservedly praised for God's cures.

In the early months of the evolution of the operation I made a drain by beating out a gold plate and cutting out the drain. It was almost as thin as gold foil. I inserted it in the case of an old lady who had a blind eye. It drained the eye, controlled the pain, and led to a short lived encouragement. The sharp edges gradually cut out and the result was nil. She did not thank me for giving her a chance. The other thirty-two are still my friends. Even this case has its good side for it led me to return to the wire and reduce its thickness.

Do not expect 100% of your path in the operation for glaucoma to be strewn with roses.

Varied Procedures Compared.

In glaucoma as elsewhere the unsuccessful treatment may be recognized by the multiplicity of remedies. The following are some of the surgical procedures which are to be considered in comparison with the metallic drain in selecting an operation in a given case:

Paracentesis of the cornea has its useful place, especially as a precursor to a more radical operation, when the eye is very hard and there is fear entertained that hemorrhage may follow the sudden lowering of the intra-ocular tension. By it a very few drops of aqueous may be allowed to escape, and the eye softened for a short time during which the choroidal vessels adjust themselves to the new tension and are less likely to bleed when the final operation is performed. The opening following a paracentesis is so small and the healing is so complete that diminution in the pressure is maintained for but a short time. It is often a success in acute but offers nothing permanent in chronic glaucoma.

The Graefe operation of iridectomy sufficed in cases of acute glaucoma leaving little more to be desired. But, it is to be borne in mind that chronic glaucoma or glaucoma simplex is a different type of disease, and the profession has turned away from iridectomy for the cure of chronic glaucoma. Like all other operations a certain percent of the cases were helped. In my early experience I recall about 50% of cases of chronic glaucoma which retained vision. Likewise in a proportion of cases medical treatment helps in the race between blindness and death. What I am hoping for is that the "mule shoe" drain will be found to be dependable and the results uniform in a larger percentage of cases than is found to obtain with any other operative method.

Anterior sclerotomy is subject to the same objections. A narrow cataract blade is passed through the anterior chamber and an opening similar to that of a paracentesis is made at the point of puncture and counter puncture. The purpose served by these openings is transitory. This operation had its advocates in the days when it was supposed that the cicatrix had the quality of leaking and thus maintaining a reduction of the tension. The fact however, is established that they do not drain, even as well as normal tissue, in consequence of which the operation has in large part, been abandoned.

The Lagrange operation was a step forward. It consists of

making a flap with a cataract knife and trimming off the edge of the flap with curved scissors to prevent perfect coaptation of the edges and favor a continuous leakage of aqueous humor.

The operation works well in a large proportion of cases, but in the minority the wound becomes completely closed which arrests the escape of the aqueous. In other cases it is found that minute fistulas favor the development of infection and in a number of instances suppuration and loss of the eye has occurred weeks after the operation. It is believed that this objection will be corrected in a large part by the adoption of the high incision of the conjunctiva which does not approximate the limbus.

Limbal puncture was recommended by Priestly Smith and had its day. The objection to it was that it enforced a perforation of the eye at the vulnerable situation over the ciliary body, and besides failing to drain in a large percentage of cases, it sometimes caught a nerve in the healing and otherwise led to sympathetic complications.

The wedge isolation operation is subject to the same objection as the Lagrange, and is less easily performed, in consequence of which it has had no large number of followers.

The Holth operation differs from that of Lagrange only in that the margin of the flap is trimmed by the use of a punch in place of the curved scissors.

Borchen's operation of iridotaxis seems to me like a retrograde procedure, rather than an advance in ophthalmology. It consists of producing the condition we ought to try to avoid in operations involving the iris. It has been observed that when the iris is left in the wound following an operation for cataract or glaucoma leakage was likely to take place by virtue of the opening failing to close completely around the tag of iris which was left in the angle. The operation consists of deliberately leaving the iris between the lips of the wound, which procedure would be censured by every one when applied to the operation of cataract: then why tolerate a procedure which is self-condemnatory. It is a case of the adoption of the lesser of two evils.

Cyclodialysis has for its object the drainage of the aqueous humor into the circumchoroidal space. It is difficult to perform, and the results were good in too small a proportion of cases in my experience to lead me to give it further consideration.

The Herbert operation and the **Valent** operation con-

sist of making an incision with a Keratome two and one-half millimeters back of the limbus, and subsequently dividing the anterior flap as far forward as the limbus, making a T-shaped incision. This is possibly superior to the classical Keratome incision for the edges bulge forward and closure is retarded.

Following this idea:

The Todd operation is effected by a Keratome knife. A cutting edge producing what the author styles a "back-bite."

A "leech-bite" works well until it closes with a clot, after which it is impossible to make it leak again. It is to be remembered that the aqueous humor which is secreted under diminished tension contains fibrin, and were it not for this no corneal wound would heal.

The fibrin clots the whole length of a cataract incision within a few minutes after the completion of the operation and ultimately precludes the possibility of aqueous seepage.

The Elliot operation of trephining is the one which has received the greatest degree of favor, because it was based on the rational procedure of opening the eye with a trephine exactly on the limbus. Were it not for the fact that about thirty per cent of these openings close, and that every now and then one sees a report of intra-ocular infection following several weeks or months after the operation it would seem to be the ideal operation, and is perhaps, the operation of choice by the greater proportion of oculists today. The operation consists of turning a narrow flap of conjunctiva, undercutting the cornea, to expose the limbus, trephining through the limbus and closing the flap. Fox spoiled the operation, in my way of thinking, by making a quadrangular flap and cutting it off at the corneal margin, at which it should have been left attached, the effect of which is to expose the trephine opening and invite infection.

The Zorab operation was stimulated by the number of failures on the part of the Elliot operation to maintain permanent drainage. The failure to accomplish the purpose in thirty per cent was regarded as too great a proportion and Zorab proceeded to increase the permanency of drainage by introducing a thread into the anterior chamber, which was to be left in situ permanently.

The Mayou operation appeared in the same *Journal* (Ophthalmoscope, May 1912) and was almost identical. It consisted of making an opening into the anterior chamber and inserting a knot of silk leaving the ends to project out under

the conjunctiva. The idea seems rational except for the selection of a thread as the material for the drain, but this objection does not seem to have appealed to Casey Wood.

The **Casey Wood** operation was offered after seeing the cases of Zorab in Oxford, and after performing some of the operations himself. It consisted of passing a Graefe knife, with an eye near the point, through the anterior chamber as in the linear extraction of cataract. The eye is threaded with white silk and the knife is withdrawn. A needle is used to conceal each end of the thread under the conjunctiva where it is supposed to escape the danger of gathering residual and other germs.

The operation is difficult to execute, especially in cases of a shallow anterior chamber, and the whole question of the wisdom of using a material which is likely to become infected is open to criticism.

The operation of Abadie and Jonnesco, excision of the superior cervical sympathetic ganglion, Badal's avulsion of the infra-trochlear nerve, and Rohmer's operation for removing the ciliary ganglion have ceased to be considered excepting as matters of history.

The "mule-shoe" might be regarded as an auxillary to the Elliot. It does not lend itself to the LaGrange or any incision by a keratome.

It would seem to serve as a substitute for all forms of drains, thread, horse-hair, etc. The author realizes the necessity of carrying forward one more series of observation, viz.:

Test the efficiency of the "mule-shoe" drain in eyes in which the Elliot or LaGrange have failed. This would answer the question as to how much may be attributed to the trephine opening per se, and what proportion of credit should be attributed to the drain.

Thus far two cases operated by the drain have previously been trephined. Further attention will be given to this point.

Illustrative Cases.

The following cases are appended in abridged form to illustrate the later range of types of intra-ocular tension which has been subjected to the above method of treatment. Cases with good vision have been chosen as well as those which would have formerly been subjected to evisceration. (I consider it a crime to enucleate, except for malignant growth.)

The following is the first case in which I had occasion to use the "Mule Shoe" drain.

First.—Mr. P., of Virden, Illinois, had been having a very serious time with herpes, which terminated in erysipelas, and confined him to his home for a period, during which he developed what I infer to have been an acute glaucoma. When I saw him, some weeks later, he had great pain, high tension, and haziness of the cornea. I considered it quite justifiable to make an observation on the behavior of a gold drain inserted into a trephine opening. Accordingly, I called on a jeweler to draw a gold wire to the size of a No. 20 gauge, which was the smallest he had, and make a ring with an extension, or toe, turned at a right angle, one and one-half millimeters long. I placed this extension in the trephine opening at the limbus, and covered it with the usual flap. The pain and congestion, which were extreme before the operation, abated rapidly, and at the end of ten days he was able to go home and report at intervals of a week. Upon his return the haziness of the cornea and the congestion of the eye had improved, but he showed a disinclination to raise the upper lid. The tension was normal, and he felt no irritation whatever from the presence of the wire. At the end of the second week the condition was the same, except that it was noticeable that the wire was more plainly visible. After six weeks the wire became exposed at one point, but its presence produced no irritation which could be distinguished by the patient, although he was disinclined to raise the upper lid. Upon being asked if he felt anything in the eye, he invariably answered "no." Subconjunctival drainage was indicated by the presence of edema of the conjunctiva. At this juncture I decided to remove the wire drain. The removal of the wire drain was followed by the immediate emptying of the anterior chamber, which, however, promptly refilled. During the following two weeks the ptosis disappeared and the tension remained normal. At the last tonometric reading it was twenty-one millimeters. He is entirely well after eighteen months.

Mr. C., Cayuga, Ind.

I operated by trephine six years ago on account of advanced Glaucoma. He did well. Six months ago he returned with 80% vision in the fellow eye. Had excavation and commencing contraction of field. A "mule-shoe" drain was inserted and

there has been no progress of the disease. He is a busy merchant and has no inconvenience from the presence of the drain. Mrs. A., Los Angeles, Cal.

Had one eye with perception of light and the other with a deep excavation and field contraction to a radius of 10 degrees. I had little hope of retaining vision because my experience is that these cases ultimately become blind from the atrophy which has been started. She wanted a chance and I put a drain in each eye. She made a good recovery, and still has a small field which enables her to encompass the doors and windows of her room. It will be educational to note if she preserves the small central field. Tension is normal in both eyes.

Second.—Mr. T., of Pawnee, Illinois, was brought to me suffering extreme pain in an eye which had been glaucomatous for a considerable time, but which had never given him much trouble, the remaining eye being unaffected. Tension, fifty-eight millimeters. Vision too poor to get field. Congestion great. A repetition of the same operation performed on Mr. Post was determined upon, and executed without delay. The case of Mr. Tilley improved more rapidly than that of Mr. Post. At the end of a week he had no pain, normal tension, and very little congestion; yet some appearance of ptosis. He returned home at the end of a week and has reported at intervals of a week since that time. He is absolutely unconscious of pain or irritation from the presence of the wire up to the date of this publication, which is seventeen months. This case is remarkable as illustrating the toleration of the wire, the diameter of which is three times that of the size of the wire used at present.

Case Mrs. C., Decatur, Ill. 52 years of age. Mother of ten children. Being busy with her cares, she thought she had no time to look after herself, and neglected to pay attention to the loss of vision of the right eye, which she realized was failing. She was the victim of intolerable headaches, which had been considered migraine.

She became alarmed when she failed to get satisfaction from the glasses which an optician had prescribed. She consulted me about the middle of May, and I found that the right eye was practically blind, and the tension 45. The tension of the left eye was 38, and the field of vision contracted. There was a deep excavation of both papillae. I decided to insert a mule-shoe drain in the left eye in the regular way, and in

the blind eye I determined to insert the toe of the drain into the anterior chamber through the keratome incision.

The operation was done under cocaine, and the immediate results of both operations were excellent. She had sub-normal tension, and shallow anterior chamber for six days. I saw her the following week at her home, and found that the chambers were shallow, the left eye being the slowest to recover. Two weeks later I saw her again, by which time both chambers had become established, and two weeks later I refracted her, and found 20/30 vision. It is now 11 months since the operation, and she has not had a single headache, from which she infers that she has had prodromes of glaucoma for a long time. This experience is the nearest that I have ever come to connecting migraine with glaucoma.

Case Mrs. S. Aged 50, Denzer, Texas. Consulted me, on account of chronic glaucoma of the right eye. The cornea was hazy, the tension was high, and the eye was practically blind. It belonged to the type which I used to think should be removed on account of the danger of inducing a similar condition in the fellow eye. With the increased sense of security afforded by the metal drain, I decided to recommend the operation of trephining, and the introduction of the mule-shoe drain. The result was perfect, in-so-far as the tension and comfort were concerned. She had no pain after the operation, and the area over the field of operation is edematous from infiltration.

Mrs. T., Bluffs, Ill. Aged 60 years. Called on me Aug. 7th for the first time, and I diagnosed chronic glaucoma. She had elevated tension, excavated papillae, contracted fields. Vision in the right eye, perception of light. Vision left eye 20/50. She had not been subject to pain, but was filled with a dread that she was going blind. I gave her eserine and pilocarpine, and she returned with a report of no improvement, and that she had made up her mind to submit to the operation. She had some discomfort, but went home after two weeks.

The infiltration was ideal, and it appeared that there would be no trouble ahead. She returned after a period of a month, and it was found that the toe of the shoe had been elevated out of the opening, and that the opening had closed, and the tension had increased. Accordingly, I removed the wire, and introduced another adjoining the site of the former trephine. This time I took the precaution to put a little gold solder on the point to assist the coagulated aqueous humor in

securing it a place. After a month, the wire was found to be in place, the tension normal, and the eye comfortable.

This is the only case in which I made use of the ball tip on the toe of the drain to prevent its escape, and marks an advance in the conception of the requirements to make the drain a success. A second good point was emphasized in this case, viz., the crescent incision in the conjunctiva enabled me to insert the second drain within a few mm. distance from the one which was removed and get the benefit of the superior position under the upper lid.

It was following this experience that I adopted the key-stone type of drain.

Case Mr. C. Age 72. Was struck in the eye, rupturing the eyeball, with a resulting traumatic cataract. The cataract was removed and for a time the eye did very well. After a few weeks he developed pain and high tension, which refused to yield to medication. I determined to test the efficiency of the mule-shoe drain, with the understanding that enucleation or evisceration was the alternative. To my gratification, he became comfortable at once, and returned home at the end of a week. It is now three months since the operation, and he is comfortable, and has 20/200 vision.

Case Mrs. P. Age 70 years, very feeble. Had glaucoma for several months with failing vision. Reluctantly I consented to perform an Elliot operation for her. The prognosis was so bad that I did not want to injure my confidence in the mule-shoe drain by what seemed to be an almost certain failure at the time. Unexpectedly she made a good recovery. For six weeks the eye was soft, and she had sufficient vision to do her work. She consulted me again, whereupon it was apparent that the trephine opening had closed. I explained the metallic drain method, and she accepted the chance. The operation was done under cocaine. The lower quadrant was selected, and a mule-shoe drain inserted. She returned home on the following day, and continued to do well. She has had neither pain nor attacks of high tension, as indicated by periods of loss of vision and is able to see to get about.

Mrs. B., sixty years of age. After suffering with gradual impairment of vision for about a year, she consulted an oculist in Kankakee, who made an iridectomy. The operation was complicated by hemorrhage resulting in making it difficult in discriminating between a blood clot and the iris. The result

was that the entire iris was drawn out of the eye and vision was lost—probably from an intra-ocular hemorrhage. She consulted me with reference to the other eye, and I decided to put in a "mule-shoe" drain. At the time of the operation I discovered that my shoulder trephine had been sent away for repairs. Accordingly I made an incision with the point of a cataract knife at the limbus, and introduced the toe of the drain between the edges of the incision. This case made a good recovery. The drainage was free for several days, following which the tension rose to about twenty millimeters. I have since seen her on two occasions at intervals of a month. The vision remained the same, and the tension remained the same. She had experienced no pain and the result of the operation is satisfactory.

I was pleased with the result and decided to resort to a linear incision in the next case, which follows:

Mrs. S., Gainesville, Fla. Aged 25. The following case is of particular interest. Two years ago she was examined for refraction by a very conservative oculist, who used homatropine. Previous to this time she had attacks of pain, during which her vision would be impaired, from which it may be concluded that she had a previous tendency to glaucoma. For years she remembers seeing a "halo" around lights. On the day following the use of the mydriatic, she had a severe attack of pain lasting several hours, which was relieved by hot applications. Glaucoma was not diagnosed at that time. A year later, at her home in Florida, the local oculists used homatropine, which was followed by another attack of pain, lasting ten or eleven days. At that time the hardness of the eyeball was recognized, and eserine and pilocarpine were prescribed. She first noticed impairment of vision after the second use of homatropine. When consulted I found that the tension was increased to forty-five millimeters, and the field of vision was contracted, and the acuity of vision was reduced to eighty per cent. I recommended metallic drainage, but she preferred to continue the use of eserine and pilocarpine. After an interval of ten days I introduced a mule-shoe drain through a vertical incision. The drainage was satisfactory, and the eye remained soft. At the expiration of two weeks, it was ten millimeters. After an interval of two weeks more, the wound was closed about the drain, and the tension had risen to thirty-five millimeters, and symptoms of increased tension, blindness, halo and discomfort had returned.

Hoping the drainage would become improved, we waited for another month, after which a second operation was performed, with the introduction of a mule-shoe drain by the side of the original drain, this time performing the operation after making the trephine. The particular point to be learned from this case is that the toe of the drain may be encroached on so closely when introduced through the incision made by a cataract knife, that drainage may be insufficient.

In all other cases, with one exception, the drain has been introduced through a trephine opening.

Mrs. W. I saw her two years ago and removed the left eye on account of absolute glaucoma, hoping that the development of the disease in the other eye would be prevented. She has been using the right eye for all purposes during the past two years. A few weeks ago she developed periods of blindness and a constant halo during the interval. I examined her and found a deep excavation and a contracted field, although her central vision was 20/30.

I introduced a drain and she made a good recovery without a particle of pain and returned home. I have seen her on several occasions since the operation. She is able to read. The tension is normal, and she is unconscious of the presence of the wire in her eye.

Believing that it would be unprofitable to add further cases which would mean simply a repetition of the above the paper is herewith submitted for consideration.

In closing the author wishes to emphasize his belief that the presence of the drain in the trephine opening acts in the well known manner of a stick in freezing water.

He hopes that it may appeal to enough operators to lead to its being accepted or condemned on its merits.

He is impressed with the conclusion that unless he has been playing with luck so to speak, the percentage of relapses will be greatly reduced by the adoption of the device.

CERTAIN EYE AND EAR AFFECTIONS IN ASSOCIATION WITH HEAD INJURIES.*

BY
HOWARD C. NAFFZIGER, M. D.

SAN FRANCISCO

In presenting some special features of conditions resulting from trauma to the head, it will be the aim of this paper to

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confine its remarks to the points of particular interest to the members of this section.

Certain findings obtained by eye and ear examinations enable one to make a diagnosis of fracture of the skull. In brain injury certain complicating conditions are obtained as a result of direct injury to special organs or parts in their immediate neighborhood. These require special methods of treatment at your hands.

We shall deal first with those findings necessary in diagnosis and second, with the pathological conditions underlying them which may later require treatment.

A few minutes can well be spent in illustrating the nature of the mechanisms resulting in fracture of the base of the skull and involving structures necessary to the proper functioning of the eye and ear.

Our consideration must be mainly directed to the injuries of the base of the skull, and it is in this group of fractures that direct injury to parts accessory to the eye, ear, nose and throat occur. The proportion of fractures of the base of the skull to the total number of fractures of the skull is probably much higher than we realize from statistics.

The skull represents in a general way a sphere which has been considerably flattened at the base. The vault varies in thickness, but for the most part is about two fifths of an inch thick and protected not only by its shape, but by the fact that there are two tables of bone separated by a spongy layer, and all this in turn is covered by the very thick and movable scalp. The base, on the other hand is composed of thin plates of bone perforated by numerous openings.

In a large number of cases of head injury the point of impact is at the level of the base of the skull. All the force is applied either above the orbital rims, along the side of the head near the ears, or in the region of the external occipital protuberance.

The only fixed point of attachment of the skull is at its articulation with the atlas. This region then represents the point where a resisting force is applied. The base tends to crumple between it and the point of impact of the force. Sections of the skull just above the level of the base show certain structural peculiarities which modify the lines which fractures tend to assume.

The frontal bone, particularly at the mid-frontal region at

the external angular processes is thickened. The mastoid regions are reinforced by buttresses of bone extending up a short distance from the mastoid process. The mid-line posteriorly is thickened by an unusual heavy ridge of bone in the line of the longitudinal sinus. Between these heavier portions the bone is much lighter. This is particularly noticeable in the temporal regions where the squamous portion of the temporal bone is merely a millimeter or two in thickness and has no diploe.

The base of the skull, by transmitted light shows many areas of extreme fragility. This is most noticeable in the anterior fossa where the orbital plate seems but little thicker than a sheet of paper.

The middle fossa and the posterior fossa also have certain areas where thickening is very pronounced. It can be seen from an inspection of the base, that the lines of heavier bone all converge toward the sella turcica and it seems to be a general rule that fractures of the base have a tendency to converge toward this region. The most common site of fracture of the base is in the middle fossa.

Before going on to the specific injuries affecting the eye, ear, nose and throat, we will first discuss the eye findings which result from diffuse brain injury. In general, intracranial pressure following trauma is either from hemorrhage within the cranial cavity or from the edema which is consequent upon the brain contusion.

Acute intracranial pressure results. If from free hemorrhage it occurs immediately or in the first 24 hours. Instances of hemorrhage occurring later than this are rather infrequent.

Pressure resulting from edema usually manifests itself after 24 or 36 hours. The cause of the edema has been considered by Cannon as due to the biological principle that tissues deprived of oxygen take up fluid.

Following brain contusions the most characteristic and constant findings are of thrombi in the small vessels with areas of minute hemorrhage and edema about them. With a huge number of these, a considerable bulk of tissue is deprived of oxygen and by accumulation of fluid the edema becomes considerable. The osmotic force exerted by tissue in this condition, if in large amounts may raise the intracranial pressure to such a height that the circulatory apparatus is unable to respond in sufficient degree to maintain the intracranial circu-

lation. Up to this stage at which death would result, the heart will maintain life by responding with a rise of blood pressure sufficient to force blood into the cranial cavity.

While ophthalmoscopic findings are of very great value and are certainly our most reliable signs in *chronic* intracranial pressure as represented in type by brain tumors, in acute cases as represented by the head injuries they are of relatively little help.

In the first 24 hours, even with marked intracranial pressure it is rather exceptional to find unmistakable evidence in the discs. After this time we secure more help from this examination and the value of it increases with the lapse of time.

Hemorrhages in the retina have been described but I have been unable to see any of these cases in which I could rule out other causes of hemorrhage.

The tortuosity and fullness of the veins, the hyperemia of the discs and later edema of the nasal half of the discs help us materially in deciding our treatment when they are present and clear up for us the meaning of signs which taken alone would be questionable. It is unfortunate that the ophthalmoscopic examinations do not reveal more that is of value to us, in the first 24 hours.

The question of the value of the pupillary findings as an aid in diagnosis, prognosis and treatment comes next to mind. All conditions are met with in a series of cases. Contracted pupils, greatly dilated pupils, equal and unequal pupils, reacting and immobile pupils, concentric and excentric ones. Not only do we see these varieties in a large number of cases, but in any case at different times we may find any or all of these occurring transiently. Their explanation is most difficult. The explanation of the pathology causing them is most involved when we consider the many factors producing the results. The brain lesions are numerous and diffuse. The chief sympathetic trunks coursing with the internal carotids as they enter the skull are at the points of convergence of all forces and to which they are subjected. Injury to trunks may stimulate or paralyze the nerves to the dilator fibres of the pupils. The third nerve is rarely injured in its peripheral course. Its central connections are, however, subjected to the same results from contusion as are other parts of the brain.

There seems to be a popular impression that the pupillary findings in head injuries are the most important and have great

significance. They, as a rule, are the first findings to be made and the first to be commented upon. They hardly deserve so much note.

From the experimental and clinical work done, one seems justified in stating that with inequality of the pupils, in a little more than half of the cases the larger pupil is on the side of the greater intracranial pressure. The value of this sign is so slight that it ought not be given too much weight when other much more definite signs are present.

Dilated and non-reacting pupils have a very definite and unfavorable prognostic significance. Recovery is most unusual in a case showing dilated and immobile pupils following head injury.

While the condition of the pupils at any one time may be misleading, frequent repeated examinations and notes of changes by the nurse in constant attendance upon the case are often of great help.

The circulatory changes in the eye due to variations in intracranial pressure have been mentioned. Aside from this the optic nerve occupies a very prominent place among the nerves directly injured in fractures. Even granting it this pre-eminent place it is not common. It occurred six times in 1,000 consecutive cases recorded by Phelps, i.e. in six-tenths of one per cent.

Callan, in the *Journal of the American Medical Association*, March 5, 1892, has written on this subject quoting a number of cases. His article is not altogether conclusive as the cases were not certified by autopsy.

The usual involvement is of the nerve, not of the chiasm or the tracts. It occurs in fractures of the anterior fossa involving the orbital plate. The fracture extends into the optic foramen and through the greater wing of the sphenoid. The anterior clinoid process is left as a free fragment held only by its dural attachments. It is usually forced downward compressing the nerve as it passes through the foramen. Following such an injury blindness is usually immediate and total. Unmistakable signs of primary optic atrophy appear in about two or three weeks. In this connection a case demonstrating a later onset of blindness is worthy of note.

The patient had a fall resulting in a fracture of the anterior fossa and of the squamous portion of the temporal bone on the right side. There was only moderate brain contusion.

For the first two days there was vision in both eyes. During the third day vision in the right eye failed and total blindness in this eye resulted. During the succeeding two weeks no definite changes could be found on painstaking and repeated ophthalmoscopic examinations. There was at no time any indication of circulatory change in the eye. Death occurred from pneumonia following operative treatment of a compound fracture of the jaw. Autopsy revealed a displacement of the right anterior clinoid downward compressing the nerve to a flattened ribbon of about one third its normal thickness. In front of the compressed portion the nerve and its envelope were very bulbous and edematous.

This case is quite unusual in that vision in the eye was normal or nearly so for the first 48 hours following the accident. In spite of such an exception, immediate blindness is the rule. It is seldom bi-lateral. It is permanent.

A recent case referred to me for examination gave history of total blindness following a fall from a hay wagon. It is interesting to note that this case which suggested a bi-lateral optic nerve injury, proved to be due to dislocation of a long standing pituitary tumor which had previously given insignificant symptoms.

Regarding the treatment of primary optic atrophy after head injury. Can anything be done? I would like very much to hear an expression of opinion. If the compressing bone is removed will vision be restored? How long an interval would be compatible with prospects of restoring vision?

Such attempts have not to my knowledge ever been made. The possibility of elevating the depressed plate from the orbital side is suggested.

The changes so far mentioned are in the optic nerve and in the eye. The question of the value of sub-conjunctival and palpebral hemorrhages as diagnostic points comes next. They are frequent and usually in association with other signs which are more reliable. It is frequently impossible to rule out direct injury to these structures or to the tissues about the orbit permitting gravitation of blood. In the absence of direct injury, such hemorrhages speak for fracture of the anterior fossa. Particularly the late appearance of ecchymoses in one, two or three days following the injury speaks for fracture. Such palpebral ecchymoses or subconjunctival hemorrhages coming late and without swelling are valuable signs.

Injuries of the third, fourth, and sixth nerves in their peripheral course are quite uncommon. Of these, the sixth occurs most frequently. This is probably due to the fact that the sixth nerve has the longest intracranial course. It passes just to the side and below the tip of the posterior clinoid. The tendency of fracture lines to converge to this region has been mentioned.

Direct injury to the nerve at this point may occur. Its frequency is no doubt lessened by the very strong attachments of the dura of the tentorium to the other structures in this vicinity. These attachments do not easily permit of dislocation of the tips of the posterior clinoids. Injuries of the third and fourth nerve are seldom ever seen.

Discharges from the nose and throat are most frequently of blood. The blood most commonly follows fractures of the body of the sphenoid—this being included in a very large proportion of all fractures of the base. The continued discharge of clots from the nose is not uncommon after fracture and may last for days. A very slight rupture of the mucous membrane of the nasopharynx is all that is necessary to permit of a considerable hemorrhage following fracture of the sphenoid. The ethmoid is occasionally involved in the fracture of the anterior fossa. In these cerebro-spinal rhinorrhoea may appear. Injury of the first nerve—the olfactory—and with consequent anosmia unilateral or bilateral is quite common and is usually overlooked.

With regard to ear lesions. These occupy a most conspicuous place. Of all the direct signs of a fractured base, hemorrhage from the ear is most valuable and reliable. It is not given enough weight. It is too often called rupture of the drum without any thought as to the mechanism of that rupture.

The remarks of Phelps are impressive. "The hemorrhage from the ear is not only the most frequent but also one of paramount importance. As a positive sign it may be considered pathognomonic of fracture of the petrous portion of the temporal bone involving the internal auditory passage and followed by rupture of the tympanum from pressure of extravasted blood."

In a series of 1,000 cases by Phelps, hemorrhage from the ear occurred 285 times. The single exception to the above as an absolute rule was encountered in a case of gunshot wound inflicted at short range immediately in front of the ear, in which

a slight hemorrhage occurred. Post mortem examination showed a petrous fracture through the auditory canal. In no instance in which hemorrhage from the ear was absent, was such a fracture disclosed.

The observance of even slight bleeding and the correct interpretation of it is then most important. Direct examination and inspection of the drum is difficult as the hemorrhage obscures the field and the patient is frequently restless and irritable. These lacerations of the drum usually heal promptly and per primam so that after a very few days it may be impossible to determine their presence.

It is not usually important as less detailed examinations will clear up the question as to whether the blood found in the meatus has run into it from a wound elsewhere on the head or from an injury to the meatus itself. If the blood is actually coming from the ear the inference should be clear.

It is rare to have secondary infection of the ear, or of the meninges occur from such an injury. As a preventive—gentle swabbing of the outer half of the meatus with cotton and a mild antiseptic and a light cotton plug—is desirable. More active measures, such as irrigations or tight plugging of the meatus defeat their own aims and favor infection.

In 1,000 cases of fractured skull—285 had bleeding from the ear. Four of these developed ear or mastoid infections—only three purulent, i. e. only 1.4 per cent. of those having bleeding from the ear developed ear or mastoid infection. It is obvious that any early, radical preventive treatment on the basis of possible infection is not justifiable.

I have seen but one case of meningeal infection from fracture of the middle ear and this must be accepted with some reservation as a growth was not obtained from the cultures. This patient, three days following the fracture developed headache, stiff neck, positive double Kernig sign with a rise in temperature. The discs were hyperemic. Spinal puncture revealed a clear fluid with a cell count of 75, all polynuclears. Immediate sub-temporal decompression with drainage instituted between the temporal lobe and the petrous portion of the temporal bone resulted in a complete and permanent subsidence of all symptoms in two days with prompt recovery.

In this case a growth was not obtained from cultures taken from the cerebro-spinal fluid.

The danger from serious infection is far greater in fractures of the anterior fossa which readily communicate with the nose than in fractures in other basal fossae. The risk of sudden rises in intranasal pressure such as are produced by sneezing is considerable, in that infectious material may be forced upward. All means should be taken to avoid such accidents.

Notwithstanding the fairly frequent direct passages opened to the outside by fractures through the petrous, the sphenoid and the ethmoid bones—meningitis is not often seen. In the older writings, the dangers of meningitis are heavily emphasized and for that matter should still be emphasized and all possible means taken to prevent it. However, it is not frequent.

Among the discharges from the ear besides hemorrhage are cerebro-spinal fluid, serum and the products of inflammation. The discharge of clear fluid from the ears or nose may be either of serum or cerebro-spinal fluid. The latter can be recognized, if a sufficient quantity can be collected, by its limpidity, the presence of reducing bodies, and absence of albumen reactions. It is usually preceded by free hemorrhage.

Examination of structures adjacent to the ear following trauma gives information of value.

Echymoses over the mastoid and close to the attachment of the pinna are common and often so slight as to entirely escape observation unless specially looked for.

Echymoses represented by a horseshoe shape line arching around the upper half of the pinna and auditory meatus are often found. These are always strongly suggestive of fracture though not to be compared in value with hemorrhage from the ear.

The mastoid and horseshoe echymoses might occur from direct injury to the soft structures or from the gravitation of blood from the temporal fossa. With such echymoses however, the injury is in the majority of cases sufficient to have produced fracture.

Mastoid echymoses, when very extensive and associated with edema or with bogginess which comes from blood beneath the scalp, are practically pathognomonic of fracture. The very extensive echymoses which occur usually mean involvement of the lateral or sigmoid sinus. With edema—venous thrombosis with obstruction of the perforating mastoid veins should come at once to mind.

Closely associated anatomically with these structures in the temporal bone are the facial and auditory nerves. The facial more than any other cranial nerve shows some sign of involvement usually slight and transient but sometimes of months duration and occasionally permanent. Considering its tortuous course through the temporal bone its injury is not surprising. It is extremely difficult to secure the reports of the exact anatomical findings in cases with permanently injured nerves.

The great majority of injuries are from the pressure of extravasated blood and not from direct pressure of bone fragments.

Cortical hemorrhages or extradural hemorrhages from injury to the middle meningeal artery on the opposite side may give a marked facial paralysis with insignificant paresis of the arm and leg. This occurs most often in bleeding over the temporal lobe when the upward extension has just reached the lower end of the motor cortex. A superficial examination in such a case might cause one to confuse it with a peripheral nerve injury on the same side as the paralysis. Such an error could not be made in a careful examination—but the possibility of it should be borne in mind.

The eighth nerve is not infrequently involved. Aside from nerve or middle ear injury, some impairment of hearing may be present for a considerable time due to blood in various parts of the ear.

Dizziness and staggering are of course two of the most prominent, persistent and troublesome symptoms which remain after cranial traumata. They contribute more to the morbidity, and to the disability than any other post-traumatic symptoms. These have not been demonstrated to be due to any direct injury to the vestibular apparatus.

In this length of time it has not been practicable to more than touch upon some of the points of interest. Many others of equal importance—such as the value and special uses of the X-ray in demonstrating cranial fractures—the interpretation and errors in interpretation of plates—the use of cerebrospinal antiseptics and the injuries to the pituitary body have necessarily been omitted.

POST OPERATIVE HAEMORRHAGE IN A HAEMOPHILIAC FOLLOWING ENUCLEATION OF
THE EYE-BALL.

BY
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TOLEDO, OHIO.

The following case occurred in my practice a number of years ago:

Case Report:—

R. H., white male aged 7 years. The history given was that the patient was struck in the right eye with a 6-inch spike. An examination showed intense chemosis, dilated pupil, exophthalmus, and subconjunctival (bulbar) effusion of blood, but no contusion or injury to the lids. Cornea intact lying at the bottom of a cup formed by the effusion of blood under the bulbar conjunctiva.

Treatment:—

This consisted of an external and internal canthotomy to relieve the pressure upon the cornea. The oozing of blood incident to this minor operation was easily controlled by haemostats. Prescribed atropine 1½% solution and acidum boricum, saturated solution every four hours to flush out the eye.

About 14 hours afterwards was called to the hospital on account of bleeding, which I controlled by sutures, haemostats and packing. The bleeding came from the canthotomy incisions.

Next day the cornea had sloughed and panophthalmitis was imminent. Primary enucleation decided upon and performed. The following day the patient had a continued oozing and extensive infiltration of blood into the subcutaneous tissues both above the orbit and below extending over the cheek. The bleeding in spite of packing, pressure bandage, and appropriate treatment locally and internally, repeatedly filled the dressings.

For days we were compelled to give the little patient an anesthetic at each dressing which was repeated sometimes two or three times daily. This was a matter of no small moment, but was absolutely necessary because of our inability to control the patient sufficiently to apply the dressings. At the end of this time he was quite exsanguinated, with all of the accompanying signs and symptoms, indeed this was so marked as to lead one to wonder whether he had enough blood circulating to

keep him alive. By this time both above the orbit and below, and nearly to the ear a sloughing process had converted the entire area into an unhealthy ulcerative condition. (This will be appreciated by referring to the accompanying picture.)

About the fifteenth day granulations appeared in this region and with this event all oozing stopped.

Seven weeks afterwards I replaced the lower eyelid with



Showing Sloughing Process about Orbit.

Thiersch and Wolfe skin grafts and also over the cheek and temple. The grafts took satisfactorily and the patient made a good recovery. He was, however, unable to wear a prothesis.

Remarks:—

The condition of haemophilia is encountered from time to time by the ophthalmic surgeon and cases have been reported

mentioning its occurrence after tenotomies, enucleation, and even after cataract extraction.

Unfortunately for the operator the diagnosis is usually made after the symptoms of haemophilia have developed. Legg in his classical review of the condition states that bleeders are always in good health except that they suffer from anaemia. They often have blue eyes, thin skin, and prominent viens. He also states that it is rare for haemorrhages to appear after the twelfth year. In a large number of instances the first attack occurred before the fifth year. Its most usual appearance is about the end of the first year.

We owe the origin of our knowledge of this disease to Dr. John C. Otto, a Philadelphia physician who in 1803 published an account of "An haemorrhagic disposition occurring in certain families."

There are several interesting and remarkable features of this disease. The first is that women are rarely affected with this predisposition. Females when afflicted do not present typical cases. The female members transmit the tendency to the male members of their progeny alone. This point, however, is in dispute and because of its importance we beg leave to append the following rather extensive comments relative to this phase of the subject.

Holt: "Diseases of Infancy and Childhood, 1910, p. 870:

"Males are much more frequently affected than females, the proportion being about 12 to 1."

Albut's System of Medicine, 1900, p. 549:

"Beyond hereditary transmission hardly anything is known of the causation of haemophilia. It affects especially the male sex though cases in women have been described."

Payne: General Pathology gives the ratio as being 11 males to 1 female.

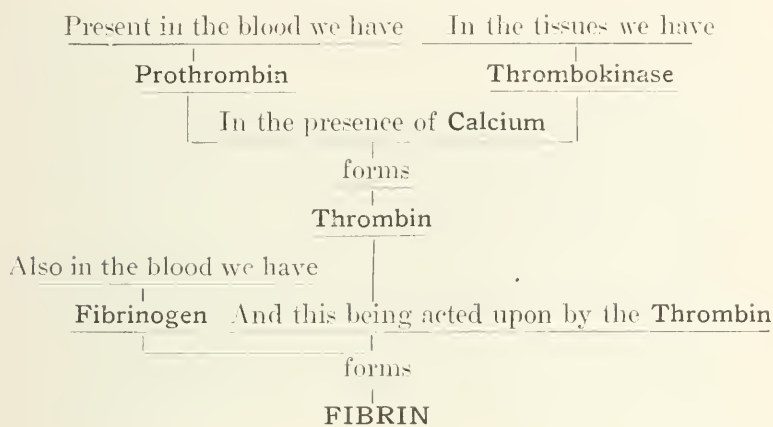
Wilson sec. edition, p. 1158:

"Usually, however, the transmission follows a peculiar line of heredity, viz., that females transmit while males acquire the condition. Exceptionally females acquire the tendency, the ratio being about 13 to 1."

Virchow, according to Anders, in his Practice of Medicine states that one woman is affected to every 7 males.

Rose and Carless Surgery, 1909, p. 296 state: "That females transmit while males of the succeeding generation inherit, and further states that the females of this generation may entirely escape the bleeding tendency."

The second feature of interest is the pathology of the coagulation process. To appreciate this, accepting Schmidt's views of the factors entering into the development of coagulation we have the following process taking place normally.



It is the opinion of physiologists and pathologists that the Thrombokinese is either absent or deficient in these cases of haemophilia. Quoting Osler: "I think to say that it were absent would hardly be correct in all cases because coagulation of a limited degree takes place around the edges of the wound, but it has been noticed that coagulation very ineffectually occurs in the centre of the bleeding area."

The family history of my patient showed that there was a bleeding diathesis. In regard to this, I wish to quote Bulloch and Fildes who state that "No solitary haemorrhage, however inexplicable should in our opinion, be regarded as haemophilia, it is necessary to show that the individual has been repeatedly attacked, if not from birth, from infancy." Upon closer inquiry after the apparent bleeding tendency in my case I was able to establish a clear-cut case of bleeding for some years previously.

Recently we have noticed an article reporting a similar haemophilic experience following enucleation by Dr. John Green, Jr., of St. Louis. This has led me to look up my records to refresh my memory as to the details. The strenuous, worrisome, experience in gross was sufficiently engraven on my memory to require no further reminder.

Suffice is to say it is a condition that taxes one's patience and makes no small demand on one's surgical resourcefulness.

PARINAUD'S CONJUNCTIVITIS.
REPORT OF A CASE.

BY

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Lymphoma of the conjunctiva was first described by Parinaud in 1889, and since that time has claimed the attention of ophthalmologists by reason of its rarity and obscure etiology. Parinaud believed it to be due to a contagium from animals, and various etiological agents have since been advocated.

The disease is regarded as tuberculosis by Stern and Meisner. Moellers¹ obtained pure cultures of human tubercle bacilli from two cases of Parinaud's conjunctivitis. Rolandi² reported a case which gave positive inoculation results. In Bernaud's³ case no Verhoeff organism was found. Tuberculosis was excluded by animal inoculation and the Wassermann was negative.

Verhoeff⁴ reported the finding of characteristic micro-organisms within the areas of cell necrosis. He believed the organism to be a leptothrix. Keiper⁵ reported finding fungus filaments resembling those found in mycosis of the tonsil.

H. S., girl, aged 13, came to the municipal eye clinic December 24, 1915, complaining of a "growth" under the upper lid of the left eye.

HISTORY: About two weeks ago she had a "spell like taking the grippe." Slight cough, chilly sensations, anorexia and malaise. She was in bed one day. The next day her mother noticed that the left eye was red, but thought nothing of it. Later the girl experienced the feeling of a foreign body in the left eye, and also noticed a swelling in front of the left ear.

No one else in the family had been recently ill. Upon questioning I found that the child had been playing with a pet cat. (According to Keiper⁶ a case was reported by Suda-Nippon Gankkai Zachi, June, 1910—in which the infection was supposedly due to a cat.)

EXAMINATION: Ptosis of left upper lid. On everting the lid, I found a very large, grayish red, non-pedunculated mass springing from the tarsal conjunctiva. This mass was covered with shreds of mucus which could be easily wiped

away. There was hyperemia of the caruncle, and very slight pericorneal injection. Iris reacted to light. The mass measured 11x6x2 mm. The remainder of the tarsal conjunctiva was covered with small granules.

The pre-auricular gland was enlarged to the size of a small walnut, and was firm. Temperature 99.2°. There was no disturbance in the right eye.



Fig. I. Photograph of Everted Lid When Patient was First Seen. Mass Outlined.



Fig. II. Photograph of Lid Five Days After Fig. I. Illustrating Very Rapid Decrease in Size of Mass.

COURSE: Dec. 27, 1915, the pericorneal injection had disappeared, and the caruncle was less inflamed. Preauricular swelling the same, but in addition the glands at angle of jaw were slightly enlarged. Temperature 99.2°. Dec. 29, the mass had markedly decreased, measuring 9x5x2 mm. Temperature 99°. Dec. 31—submaxillary and glands at angle of jaw large, but not tender to palpation.

Jan. 3, 1916—The mass much smaller, measuring 6x4x1.5 mm. The decrease seemed to take place in part

by a process of sloughing at the margins of the granuloma. Submaxillary and angle glands had decreased slightly. Remaining portion of mass was removed for microscopical study. Temperature this date 99° .

Jan. 5—Temperature 98.8° . Smaller granules disappearing. That portion of conjunctiva nearest the free border of the lid clearing first.

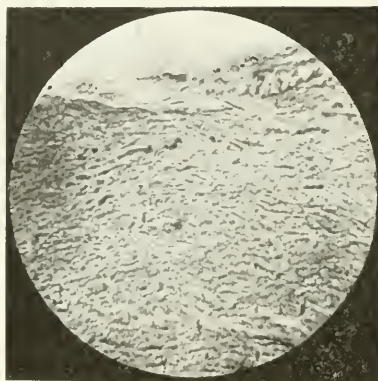


Fig. III. Photomicrograph. X1000. Showing an Area of Necrosis.

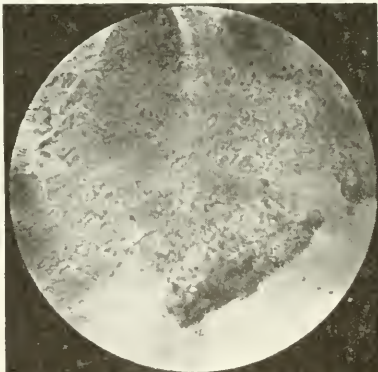


Fig. IV. Photomicrograph. X1000. Showing Necrotic Area with Sloughing of Epithelium. (Photomicrographs by Dr. F. Hecker.)

Jan. 7—Temperature 98.4° . Conjunctiva rapidly becoming smooth. Enlarged glands reduced markedly.

I saw the patient last on Feb. 5, 1916. The conjunctiva was smooth, except for a few granules along the superior border of tarsus. There was still a very slight enlargement of the preauricular gland. The submaxillary and angle glands had reduced.

MICROSCOPICAL STUDIES: Smears and cultures

made from the conjunctiva when patient was first seen showed the staphylococcus albus. Jan. 3rd I removed the remaining portion of the mass and placed it in Zenker's fixing fluid. I am indebted to Dr. E. J. Curran for having the specimen sectioned and mounted at the pathological laboratory of Bell Memorial Hospital.

Dr. Curran and I then worked together staining the sections, using the modified Gram method¹ as described by Verhoeff.

The mass consisted of granulation tissue containing a large number of dilated lymph vessels. Lymphoid and plasma cells were present, the former in large numbers. Areas of necrosis occurred throughout the tissue with sloughing of the epithelium at many points. These necrotic areas did not resemble the caseation of tuberculosis.

No microorganisms could be found in any of these sections.

Other sections were then stained with hematoxylin-eosin and with Loeffler's alkaline methylene blue. These also failed to show any microorganisms.

SUMMARY.

This case presented a typical clinical course. The granuloma was of extraordinary size and, therefore, afforded excellent material for microscopical study.

One can scarcely believe that it was possible for a mass of that size to be formed from the tarsal conjunctiva in the short period of two weeks. Yet figures I and II clearly illustrate the very rapid decrease that took place. I believe this can only be accounted for by the dilated lymph vessels.

The disease reached its climax in the conjunctiva several days before the glands attained their maximum enlargement.

I believe tuberculosis can be excluded in this case by the acute course and absence of tuberculosis lesions in the sections.

The microorganism described by Verhoeff could not be found.

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³Bernaud—Klin. M. Augenh. Vol. 51, p. 764.

⁴Verhoeff, F. H., Archives of Ophthalmology, Vol. 42, p. 345, July, 1913.

⁵Keiper, Geo. F., Annals of Ophthalmology, Vol. 22, p. 780.

⁶Keiper, Geo. F., Ophthalmic Record, Vol. 23, p. 109.

A NEW ANTERIOR CAPSULE FORCEPS.

BY
DERRICK T. VAIL, M.D.

CINCINNATI, OHIO.

The instrument shown in the accompanying illustration was devised by me to secure all or the greater part of the anterior capsule of the lens in those cases where, for any reason, it was found that the ligaments refused to separate in the attempt at delivery of the cataract in its capsule.

Victor Mueller and Company, 1775 Ogden Avenue, Chicago, have made five models for me since 1912. Each was given



Showing the Instrument (Reduced) with Blades Open.



Showing the Working End of the Author's Anterior Capsule Forceps (Magnified) Blades Closed.

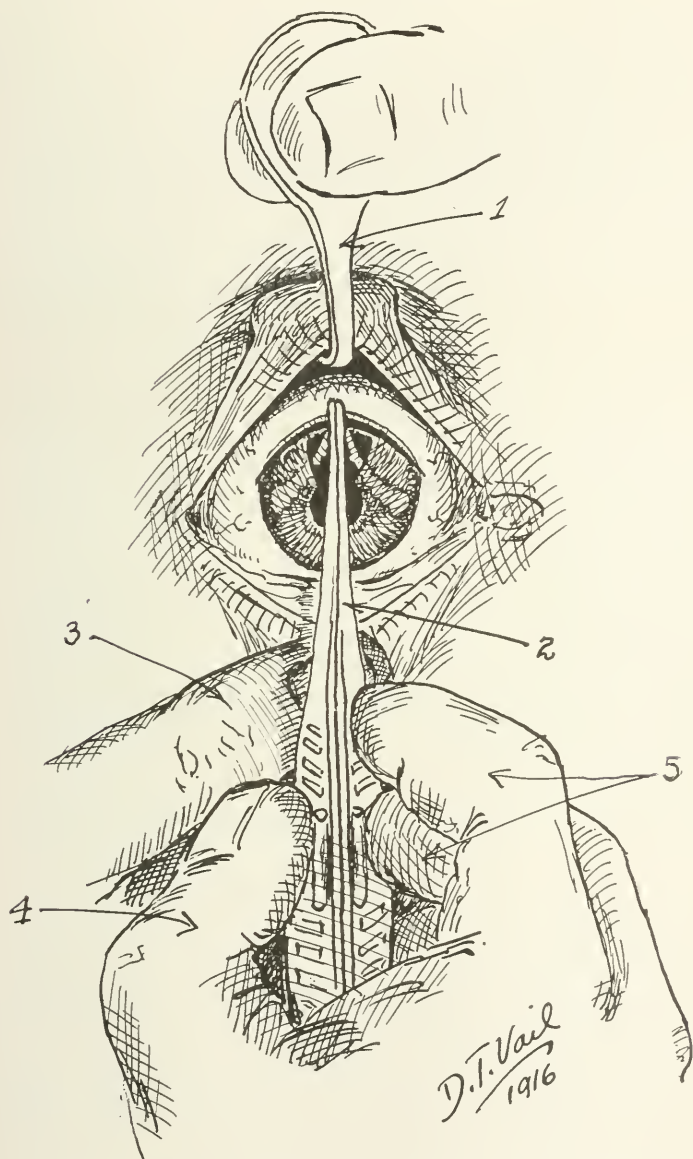
a careful trial in actual practice. This was "model four" and has proven to be perfect after over two years use in over fifty cases of stubborn lenses.

I found that by the use of this instrument, in cases where the lens balked in attempting intracapsular delivery, I could avoid introducing the spoon in the vitreous behind the lens and thus forestall a more or less critical state of affairs.

If the cataract will deliver in its capsule without threatening loss of vitreous, I have no use for capsule forceps, but if the lens shows a stubborn disposition or if the ocular state as to tension, choroidal disease, etc., is prejudicial to a smooth

operation by the intracapsullar method, I have found this instrument of immense value.

The following points are claimed:



- (1) The Author's Upper Lid Retractor.
- (2) The Author's Anterior Capsule Forceps in situ behind the Iris.
- (3) Forefinger of Operator's Left Hand controlling the lower eyelid.
- (4) and (5) Thumb and Fingers of the Operator's Right Hand Grasping the Instrument like a Scalpel.

(a) The spatula-like, disc-shaped end will pass down behind the iris to the periphery of the lens with surprising ease. (An iridectomy is necessary.)

(b) On opening the blades they flare a little, so that the teeth will engage the live capsule at once, and on closing the blades the teeth resume a smooth plane.

(c) The construction of bevels on the blades is such that it is impossible to pinch the iris at any point.

The following sketch is designed to convey how the instrument is used:

The deWecker principle is employed. The end is turned at such an angle as will permit its use without shifting the control of the upper lid: Thus, in case of a resisting lens, it is but the work of a moment to tear off the anterior capsule with this instrument and then go on with the delivery.

In using it I must caution not to dig backward in order to get a grip. Simply pass the tip between the iris and lens, open the blades to the limit, adapt the blades to the plane of the capsule, close them slowly and then gently or coaxingly strip off the capsule.

The capsule specimen is floated in 1% carbolic solution, teased out on a slide, stained and preserved for demonstration.

I have used this forceps in over fifty ominous cases and have converted them all into smooth operations without the loss of vitreous. Very immature and nuclear cataracts will yield up their anterior capsules with no operative complications and surprisingly good end results.

RECTAL (OIL-ETHER) ANESTHESIA IN OPHTHALMIC OPERATIONS.

BY

THOMAS L. DAGG, M. D.

ANESTHETIST TO ST. LUKES AND ILLINOIS CENTRAL HOSPITALS.
CHICAGO.

Since the introduction of oil-ether colonic anesthesia by Gwathmey of New York, its usefulness has been established in a large number and variety of operations.

Rectal anesthesia has undergone a gradual development since it was first used by Pirogoff in 1847, when he reported the use of ether and water injected per rectum with a view of facilitating the performance of operations upon the head and neck. His report of 82 cases with two deaths, however, seems to have prevented its popularity at that time until 1884, when

it was revived again by Yversen of Copenhagen and Molliere of Lyons, who used only the ether vapor per rectum.

This method was used by different men to some extent, but was given up as unsatisfactory owing to the complications attending its use, such as melena, diarrhoea, bloody stools, rectal irritations, etc.; these complications were not even eliminated entirely by the Cunningham method of introducing ether-laden air in 1902, although they were greatly decreased. Sutton in 1910 seems to have obtained up to that time the most satisfactory method of administering ether vapor per rectum by using the ether vapor with oxygen gas. He reports 140 cases in the Roosevelt Hospital service by this method in patients whose ages ranged from 2 years to 77 years, and operating time from 5 minutes to 2 hours and 20 minutes. While Sutton's method of ether vapor and oxygen seemed well adapted in experienced hands, his apparatus for administration was more or less cumbersome, and even he himself had complications following its use, which made it unpopular and finally was abandoned.* This finally led to the introduction some three years ago by Dr. Gwathmey of New York of an oil-ether combination, which has seemed to meet all the requirements of success in obtaining and maintaining a satisfactory surgical anesthesia free from post operative complications. We have used this method at St. Luke's Hospital during the past two years in various operations about the head and neck, and find it useful because it gives a clear field for the surgeon and his assistants to work; also because it allows greater freedom of posture of the head, as in mastoid or brain surgery, where the head is often in the position of face downward, thus making it difficult to maintain anesthesia in the ordinary way.

It is not only a convenient method from the surgeon's standpoint, but often a very acceptable one from the patient's point of view, where fright, nervous strain, agitation and fear predominate, as in many of the goitre cases, this method of anesthesia may be administered to them in their bed, and they are asleep without realizing that anything is being done except the giving of a harmless enema. This to my mind is one of the most valuable features which this form of anesthesia possesses, as fear and nervous excitement in a case of exophthalmos under-

* Note: The foregoing historical data has been obtained from Gwathmey's review of the subject in the *American Year Book of Anesthesia*, 1915, p. 182.

going the ordeal of ether anesthesia contribute more to the surgical risk of these cases than all other preventable factors combined. This method may also be used to advantage in cases of lung complication, as asthma, bronchitis, emphysema, pneumothorax, consolidation, etc., since the irritation of the ether vapor in the respiratory tract is done away with.

Indeed, this method of rectal anesthesia need not be confined to operations about the head, but may be used generally, except when the operative procedure involves the gastrointestinal tract. I would not advocate its general use, however, as being superior to other methods in use unless the other methods were contraindicated by some conditions as mentioned above.

Technique of administering Oil-Ether per rectum for Anesthesia. Preparation of Patient:

The patient is given a cathartic the night before, say at nine o'clock, either castor oil or comp. licorice. Four hours previous to operation a plain enema is given. This is repeated in two hours, the last one being more of a colonic flush, and continued until return flow is clear. The success of the anesthesia depends largely upon the thoroughness with which the lower bowel is cleansed out by this second enema, as it requires a clean mucous membrane in order to get sufficient absorption of the oil-ether for anesthetic purposes. In addition to the colonic flush the patient should be given a preliminary of morphia with atropine sulph. one hour before operation. Depending upon the size and age of patient, from $\frac{1}{8}$ to $\frac{1}{3}$ gr. of morphia with atropin $\frac{1}{150}$ gr. should be given. In large, strong, healthy adults I like to use two doses of $\frac{1}{6}$ gr. each, a half hour apart, as the divided dosage seems to work better than a single large dose.

I have also used a combination of scopolamine and morphia, but I believe the scopolamine produces too profound a sleep, which lasts too long after the anesthetic agent has been withdrawn, to render it safe as a routine procedure. For example, a patient being operated for carcinoma of the jaw requiring resection, etc., when the swallowing muscles are impaired, such a patient should be awake or semi-conscious before he leaves the table. If put to bed while still unconscious there is no control of swallowing and consequently a grave danger of inhalation pneumonia from the slow bleeding in the mouth and the septic material always present in such cases. Scopolamine would be contraindicated in such cases.

After the preliminary hypodermic of morphia one hour before operating time the patient rests for 45 minutes; then the oil-ether is introduced per rectum for anesthesia. The proportions of oil ether are 25 parts oil, 75 parts ether. I use for mixing an ordinary baby's feeding bottle of 8 ounces capacity. One may use either olive oil or cotton seed oil, the latter being cheaper and just as good. Pour in 2 ounces of oil: then add ether up to 8 ounces. Cork and shake the mixture thoroughly. Then, with patient in Sims position and a soft rubber catheter introduced about 4 or 5 inches into the rectum, allow contents of bottle to run in slowly, say one ounce per minute, or a little faster. The quantity to use is determined by the patient's body weight, one ounce of oil-ether for every 20 pounds of body weight, but in no case use more than 8 ounces.

Frequently the patient is asleep by the time it is all introduced. More often there is a short stage of excitement, the patient gradually quieting down to surgical narcosis. A towel thrown over the patient's head and face, so as to retain a portion of the expired air, seems to hasten the stage of anesthesia. Perhaps in fifty per cent of cases a mask and a few whiffs of ether are necessary to get them past the second stage and into surgical anesthesia, when the mask may be removed and the face left covered by a towel. The patient, of course, must be watched by the anesthetist throughout the operation for any untoward symptoms, as too deep anesthesia, depressed respiration, an obstructed air way, etc. In case of emergency the bowel should be emptied at once of all oil-ether and washed by plain water repeatedly, while at the same time all other precautions are taken as are in use in ordinary cases.

At the end of the operation the bowel is emptied by passing an ordinary colonic tube from 4 to 8 or 10 inches carefully into the bowel and while gently massaging the colon allow the contents to return into a basin, noting the quantity returned before flushing the bowel with wash water. In this way one gets an approximate idea of how much has been absorbed of the ether during anesthesia. After flushing the bowel several times with plain, cool water, I finally introduce 2-4 ounces of olive oil or cotton seed oil, allowing that to be retained, and the patient is put to bed. As to post operative nausea, it is rare, although I have had it, in two of my cases particularly, where it was intense as well as prolonged. I have had no untoward

complications in my patients due to this method of anesthesia, such as cramps, rectal irritation or bleeding. And I can not account for the unusual amount of nausea in the two cases above mentioned.

I would mention, as a precaution, that the patient should be questioned beforehand, or examined, as to the presence of hemorrhoids or other rectal irritation, colitis, etc., as any of these conditions would, of course, contraindicate the use of this form of anesthesia.

A CASE OF CONGENITAL COLOBOMA OF THE TEMPORAL EDGE OF THE LENS AND PERINUCLEAR CATARACT.

BY

LEE MASTEN FRANCIS, M.D.

BUFFALO, N. Y.

In the July, 1916 number of the OPHTHALMIC RECORD, (Vol. 25, No. 7) Dr. Walter Baer Weidler of New York, reports in detail a case of Congenital Coloboma of the Lens located on the *nasal* side, along with a resumé of the literature and theories of causation. The following case is of interest because the coloboma is situated on the *temporal* side, although as Dr. Weidler has observed, the usual location is the lower border of the lens.

On July 3rd, 1916, a week before the appearance of the RECORD upon my table, I was consulted by Miss F. M. of Scranton, Pa., for headaches. The patient is a well-nourished blonde, age 17. American-born of Irish parentage. She weighs about 135, and gave a history of previous good health which her general appearance substantiated. There is no known instance of defective eyesight or of congenital anomalies of any type in the family. She states that her eyesight is good, although she remembers the school physician had reported that one eye was defective. Her present complaint is one of frontal headaches, and asthenopia, aggravated by eye use.

For purposes of comparison, in the following details of examination I have followed the same order as in Dr. Weidler's report:

The visual fields for form and color are normal. The pupils are equal, measuring 3 millimeters in bright indirect daylight, respond readily to light, convergence-accommodation, and consensually. Both pupils dilate readily under homatropine. The irides are light blue.

$$O.D.V.=6/9+3$$

$$O.S.V.=6/30$$

Corneal measurements: Both measure 11 by 12 millimeters.

Anterior chambers are of normal depth.

Oblique illumination: The stroma of the iris is of very nearly the same development on both sides, except on the temporal side of the left iris, immediately over the coloboma, the pits and ridges are not quite so numerous or as clearly marked as in the right iris, or elsewhere in the left. There is no notching of the pupillary edge, although the fringe of retinal pigment appears a trifle thinner on the temporal side. Upon transillumination the temporal quadrant of the iris transmits light more intensely than the other quadrants.

Ophthalmoscopic examination:

O.D. Media clear. Optic disc is of rosy type and slightly



Coloboma of Temporal Edge of Lens and Perinuclear Cataract.

oval, the long axis 60. Margins are clearly outlined. Scleral ring evenly distributed, central physiological excavation.

The blood vessels are of normal appearance and distribution. Circulatory balance is normal.

O.S. Media except the lens are clear. The optic disc is of rosy color and oval, long axis 75. Narrow choroidal ring slightly widened outwards and downwards. Central physiological cupping. The blood vessels are of normal appearance and distribution, circulatory balance is normal.

No defect of the choroid can be seen.

On the temporal edge of the lens just a trifle below the horizontal axis (about 175) there is a complete notching of the lens, the edges of which are smooth. With a 16 lens the fibrillae of the suspensory ligament may be clearly seen.

The coloboma measures $2\frac{1}{2}$ mm. at the edge and extends 2 mm. inward, about one-half the width of Dr. Weidner's case, and the notching apparently not quite so deep. There was a

complete dilation under midriasis, so that only a very narrow ribbon remained of the iris.

In the lens is an S-shaped perinuclear opacity lying in the horizontal axis, slightly eccentric toward the temporal side. The edges of the opacity are quite dense, while the central areas transmit the red reflex.

Refraction under homatropine.

Muscles: Exophoria 1 (Maddox)

Retinoscopy:

+2.50

+1.25

+2.00

+3.25

O. D.

O. S.

O. D. +1.12 cyl. ax. 15° V.=6/5—2

O. S. +0.75 sp.=+1 cyl. ax. 75° V.=6/22.3.

Post Cycloplegic test:

O. D. +1.12 cyl. ax. 15° V.=6/5—3

O. S. +1 cyl. ax. 75° V.=6/30+1

The reader is referred to Dr. Weidler's article, reference to which has already been made, for a discussion of the various theories as to the cause of coloboma of the lens.

A SIMPLE AND RAPID OPERATION FOR REMOVAL OF THE LACRYMAL SAC.

BY

F. H. VERHOEFF, M.D.

BOSTON.

(From the Massachusetts Charitable Eye and Ear Infirmary.)

Extirpation of the lacrymal sac still seems to be the method of choice in all uncomplicated cases of mucocele or chronic dacryocystitis. On theoretical grounds I feel sure that the intranasal operation, by which an opening is made from the nose into the sac, will ultimately be abandoned as unsatisfactory because even if the opening remains patent it cannot afford a mechanism for draining off the tears at all comparable to the normal one. The cases in which epiphora has apparently been relieved by this operation are probably those in which the

lacrimal secretion is ordinarily very slight. Personally I shall not become an advocate of the intranasal operation until it has been definitely demonstrated that it gives a higher percentage of permanently satisfactory results than does extirpation of the sac. Obliteration of the sac by caustics, which was recommended by Agnew years ago and more recently advocated by Gifford, should be reserved, I think, only for those few cases with fistulae in which there is a marked chronic inflammatory condition of the tissues about the sac and in which, therefore, extirpation of the latter would be difficult.

So many operations for removing the lacrimal sac have been described that I hesitate to add another to the list. The operation that I now perform, however, has been so satisfactory that my assistants have urged me to publish it. It gives better exposure of the sac, less hemorrhage, and is consequently more rapid than any other operation for extirpation of the sac that I have tried or seen used. The most important feature consists in making the incision curvilinear with the apex of the curve toward the eye and close to the inner canthus. This gives a wide exposure, while the nearness of the incision to the canthus makes it necessary to cut through only the minimum of tissue before the sac is reached. Few if any large vessels are therefore cut and the hemorrhage is very slight.

The operation may be done painlessly under local anesthesia. I regard it as absolutely unjustifiable to subject a patient to the dangers of general anesthesia in such a minor operation as this. The operative field is first painted with tincture of iodine, then Novocaine 3% in solution with Adrenalin chloride (1:10,000) is injected freely into the tissues all around the sac. About $1\frac{1}{2}$ cc of solution are injected altogether. The incision is begun about 4 mm. from the inner canthus immediately over the canthal ligament and curved upward and downward sharply toward the nose. The skin is generally so lax that it is necessary to put it on the stretch in making the incision, and care must be taken to allow for the displacement caused thereby in order to get the proper curve. The incision should be made somewhat longer above than below the ligament, the total length being about 15 mm., and should take in the whole thickness of the skin. Later the incision may be enlarged if desired. The flap is now dissected up and kept out of the way by means of a suture carried over the nose and held by the weight of a

pair of artery forceps. The next step is carefully to cut through the canthal ligament, thus exposing the sac immediately beneath it. It is now an easy matter to cut through with curved scissors the other tissues over the sac, grasp the latter with fixation forceps, and dissect it out. The cut end of the lacrymal duct is everted, but it is not necessary to probe the duct nor to occlude the canaliculi. The cavity is now dried out and swabbed with tincture of iodine or protargol 2%. In suturing the wound I usually include the cut ends of the canthal ligament in one of the sutures, although this does not seem to be absolutely necessary. I have never seen the slightest disfigurement result from cutting the canthal ligament, owing, no doubt, to the fact that the posterior portion which passes behind the sac remains intact. The wound is now freely smeared with White's ointment, a linen pad applied, the recess packed with cotton sponges wet with boric acid solution, and a tight roller bandage applied over all. This bandage is changed daily for two to four days, when it is removed and the wound simply kept perfectly dry. In case a large amount of serum collects in the cavity at any time, the pressure bandage is re-applied. The sutures are removed at the end of a week.

Plans have been perfected for giving examinations by the American Board of Examinations in Ophthalmology, a body created by joint action of the section on ophthalmology of the American Medical Association, the American Ophthalmological Society, and the American Academy of Ophthalmology and Oto-Laryngology. Dr. Frank C. Todd, 506 Donaldson building, Minneapolis, the secretary, will furnish detailed information to applicants for examination. Certain preliminary requirements are exacted, according to the length of time the applicant has been in ophthalmic practice and the nature of his training. After the year 1920 the certificate of the board will be required of applicants for membership in the two national societies.

REPORTS OF SOCIETIES

THE POLYCLINIC OPHTHALMIC SOCIETY, PHILADELPHIA, PA.

DR. WM. ZENTMAYER, *Chairman*.

"Tuberculosis of the Eye."

Tuberculosis of the Anterior Segment of the Eye: Dr. Wm. Campbell Posey referred to Tubercular conjunctivitis as being rare, and when seen probably due to direct infection. It takes the form of indurated ulcers, most observed in the subtarsal region, usually monocular, and to be distinguished from Parinaud's conjunctivitis by the absence of elongated follicles. The most common form of tuberculosis of the anterior segment is sclerosing keratitis. These cases, formerly thought to be due to gout, commencing with episcleral redness and swelling in palpebral fissure, soon tongue-shaped area pushes its way from the limbus into the interstitial lamellae of the cornea. Tubercular nodules appear in the cornea as well as the sclera. These may coalesce and the whole cornea become opaque. Disease essentially chronic and relapsing. May occasion so much thinning and absorption of the sclera that the uveal pigment shines through. This form probably due to tubercular toxines, either from tuberculosis elsewhere in the eye or from tuberculosis of the general system. The cornea may, however, be directly infected following traumatism.

In another form of secondary involvement of the anterior segment from tuberculosis of the posterior part of the eye mutton fat patches precipitate on the posterior surface of the cornea. This appearance is typical of tuberculosis, also the discrete areas of caseous infiltrate into the interstitial lamellae of the cornea. Seen most commonly in colored people. Tuberculosis may invade the iris either in the form of solitary or miliary tubercles, the bacilli showing a tendency to involve the most vascular parts, the major and minor circles. A typical tubercle is grayish white: later it may assume a yellowish appearance, due to the breaking down of the mass. Usually it is also vascular.

Dr. Posey referred to a solitary tubercle of the iris observed by him which attained large size and pressed against the back part of the cornea. For weeks the cornea escaped involvement owing to the protection offered by Descemet's membrane. Later on the interstitial lamellae of the cornea became involved by

the way of the pectinate ligament. When seen early even large tubercles are amenable to antituberculin treatment.

Tuberculosis of the Posterior Segment of the Eye: Dr. Luther Peter classified diseases of tuberculous origin as, first, lesions which are due directly to the presence of the tubercle bacillus; second, those which are due to the toxins of tuberculosis; and third, those associated with the general malnutrition and low vitality, of which most tubercular patients are victims; this group being in order of most serious consequence to the patient's vision, but in reverse order, so far as frequency of occurrence is concerned.

The frequency of ocular tuberculosis has been much disputed. Probably intraocular tuberculosis is quite as frequently found as secondary tuberculosis is observed in other parts of the body.

The first group is practically limited to tubercles of the choroid, retina, optic nerve sheath and tuberculomatous masses, in which the tubercle bacillus has been active. In tubercular meningitis they probably are more frequently found if the fundus examination is carefully and routinely made. It has been stated by Pscher that tuberculosis of the bronchial glands is a frequent source of tubercles of the choroid. Tubercles of the optic nerve sheath have also been reported.

The second group of intraocular tuberculosis is more frequently observed. In this group are the conditions which are brought about by the toxins which are carried in the blood and lymph streams. Clinically and in order of frequency they are: posterior uveitis with vitreous opacities, periphlebitis or juvenile vascular disease, disseminated choroiditis and neuro-retinitis and papilledema.

In 320 cases examined by Dr. Peter 314, or all in which a fundus examination could be made, showed a venous engorgement. Veins were tortuous, dark and overdistended. The lower veins were more distended than the upper. Thirty-two showed a neuro-retinitis of low grade; in 17 the retina was hazy, vitreous opacities were present in 7 cases, and unilateral papilledema was present in one case. The venous engorgement Dr. Peter believes to be largely mechanical in origin, although toxemia probably also plays a role in its production. Definite lesions due to the toxins of tuberculosis are more apt to appear in the latent or quiescent tuberculosis, especially when the primary focus is well removed from the eye. If toxemia plays a role,

it is very likely the toxemia which results from disturbed metabolism rather than a specific tubercular toxin.

Treatment of Tuberculous Affections of the Eye: Dr. William Zentmayer said the treatment falls under two heads: General and Local. General treatment may be considered more hygienic and medicinal, and the latter more under specific and symptomatic. The hygienic treatment belongs more to the domain of general medicine: at least its consideration will be here omitted further than to state that without its features being carried out little can be hoped from other modes of treatment.

Aside from the use of drugs to meet symptoms, such as iron, bichloride of mercury and cod liver oil, which are remedies of undoubted value as general tonics and nutrients, the specific treatment consists in the use of tuberculin in one of the several forms that are now available. As a rule the ophthalmic surgeons have taken a middle ground between those who stand for large doses and those who follow the method of Wright. Hipple's method is the one most in use. The dose is increased by this amount at each subsequent administration, and this is continued at intervals of from three days to a week, until the dose has reached a maximum of 1 mg., or until a reaction is obtained, when the dose just preceding the one which produced the reaction is again given, but not until an interval of time sufficient for a subsidence of all symptoms. Active treatment should be continued over a period of several months, and after that short courses of tuberculin should be given at six month intervals for several years.

The local treatment of tuberculous eye affections does not differ from that employed in other similar affections. Iodoform ointment and iodine-vasogen seems to have some special value in the management of tuberculous sclero-keratitis.

WALTER W. WATSON, *Secretary*.

**ROYAL SOCIETY OF MEDICINE.
SECTION OF OPHTHALMOLOGY.**

MR. PRIESTLEY SMITH, F. R. C. S., PRESIDENT.

JUNE 14TH.

Mr. G. H. Pooley sent the further notes of a case of Mikulicz's disease previously shown. A growth had been removed from the left orbit, with some difficulty. Vision in that eye steadily improved for some time, but recently there

were signs of return of the disease on the same side, though the scar was free from invasion. The removed material showed the appearances of small round-celled sarcoma.

Dr. F. R. Yelland showed a patient with loss of visual orientation, following a wound received four months previously. Soon after being put to bed, he had a genuine epileptic seizure, and was inaccessible for 14 hours. He afterwards had right hemiplegia, which cleared up later, but he had erroneous visual projection. The condition was now improving.

Mr. Leslie Paton, discussing the foregoing case, drew attention to the similar case under the care of Captain Smith and Colonel Gordon Holmes, reported in the "British Medical Journal" of March, 1916. He gave the results of the tests he had carried out in the present patient. He satisfied himself that the faulty projection was not due to defective eye movements. He believed that there had been complete destruction of the right occipital cortex, the left sensory visual cortex having escaped fairly well. There seemed to have been a complete severance of the superior longitudinal commissural fibres.

Captain Carruthers exhibited a case of retinitis pigmentosa of unusual character, in a young man who had been a soldier three months. There was no consanguinity, but a younger brother and an older sister suffered from night-blindness, and as this patient could not see to drive when dusk came on, he declared sick, and so came under observation.

The case was discussed by Mr. W. Lang, Mr. Stephen Mayou, Mr. J. B. Lawford, the president, and Mr. Leslie Paton. Captain A. C. Hudson exhibited, in a tentative form, a giant perimeter, and invited suggestions as to improvement.

Lieut.-Colonel R. H. Elliot gave his experiences with a giant perimeter which he had made, and suggested possible improvements.

Dr. A. S. Cobbledick read a paper on Four Cases of Pituitary Tumour. The cases were all in women, three over 60 years of age. The first case showed a contraction of the visual field of 10 to 20 deg. and a scotoma for colour upwards and outwards from the central fixation point. The colour scotoma bothered her a great deal when reading, and people's faces appeared blueish. There was particular contraction in the temporal half of the field. Later she had Cheyne-Stokes breathing, very violent headache, and became drowsy. The

pupils, however, were equal in reaction, and there was no papillitis: the urine was normal. Post-mortem, a pituitary tumour, the size of a walnut was found, and Dr. Buzzard regarded it as a cyst. There seemed to have been sufficient normal gland substance left to ensure normal metabolism during the six years that the symptoms lasted. The second case had right homonymous hemianopia and myxoedema. The memory had become bad, and the speech slurred and indistinct. The family and previous personal histories were good. She had well marked myxoedema, and there was a lesion of the left optic tract, probably due to pituitary growth. Thyroid extract was given, and there was improvement in the memory and in some numbness which had been present. The appearance of the discs and the constitution of the urine were normal. There was little material change in the patient's condition for three years, but after that there was fairly rapid deterioration of vision, and the nervous condition increased: there were also vertigo, and flickerings in front of the eyes. Her feet and hands also became larger. Later the symptoms somewhat resembled those of Meniere's disease, but there was no deafness nor sickness. Case 3 had optic atrophy, obesity, myxoedema and diabetes. During four years her sight had been gradually changing, and during the last year she had become very sleepy and drowsy. There was no tendency to hemianopia in this case. Her feet and hands were now definitely larger than twelve months ago, and the memory worse. Skiagrams showed an enlarged and lobulated sella turcica. Operation was declined. He suggested that possibly the diabetes was due to implication of the posterior lobe of the pituitary: or it might be caused by pressure on the medulla. The fourth case was aged 50, and her condition the author diagnosed as early optic atrophy, myxoedema and pituitary tumour. She had defective memory, thinning of the hair, suffocating feelings in the throat, heart attacks, and twelve months ago she was so ill that her life was despaired of. Her discs appeared normal, but the vision for white was contracted in every direction. Skiagrams showed distinct enlargement of the pituitary body, especially at the posterior part. He regarded this as a suitable case for operation.

The paper was discussed by the president, Mr. Leslie Paton, Mr. Stephen Mayou, Mr. Walter Jessop, and Mr. Arnold Lawson, and the author replied.

JULIUS HAYDEN WOODWARD

1858-1916.

Dr. Julius Hayden Woodward died July 2, 1916, at his home, 200 West Fifty-eighth street, New York. He was prominent among eye, ear and throat specialists, and was director of instruction in the ophthalmological department of the Post-Graduate Hospital Medical School. He was 58 years old.

Dr. Woodward was born in Castleton, Vt., and was educated at Brandon, Vt., Norwich University, Cornell and the College of Physicians and Surgeons. After studying in Berlin he was appointed to the chair of materia medica in the University of Vermont. Other professorships followed. He was president of the faculty association of the Post-Graduate Hospital Medical School. In 1908 and 1909 he was president of the Alumni Society of Bellevue Hospital.

He was a member of the New York Academy of Medicine, the Medical Society of the County of New York, the Medical Society of the State, the American Medical Association, the American Academy of Ophthalmology and Otolaryngology, the Societe Francaise d'Ophthalmologie, the medical societies of Rutland county, Vermont, and the State of Vermont, the New York Athletic Club, the Campfire Club and the Fencers Club.

He is survived by his wife, Mary Donohue Woodward.



JULIUS HAYDEN WOODWARD. 1858-1916.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that

Dr. Henry M. Cunningham, formerly of Marquette, Mich., has located in Vancouver, B. C.

Dr. Sidney Walker has been appointed assistant in the Eye department of Rush Medical College, Chicago.

Dr. F. E. Wallace of Pueblo, Colo., has been appointed oculist to the western division of the Missouri Pacific Railroad.

A state branch of the British, French, and Belgian Permanent Blind Relief Fund has been established in Philadelphia.

Dr. J. A. Donovan of Butte was elected president of the Montana Medical Association at the meeting in Miles City on the 13th of July.

An article in the July number of *PRACTITIONER* warns against the practice of opening golf balls because of the danger of injury to the eyes.

The deaths are announced of Dr. Miles C. Dunn of Henderson, Ky., aged 52, Dr. George F. Clark of Winchester, Ky., aged 47, and Dr. H. D. Baker, Springfield, Mo.

Lieut.-Col. J. D. Courtenay is in command of the West Cliff (England) Canadian Eye and Ear Hospital at Folkstone: S. Hanford McKee of Montreal is second in command: Major Alex. B. Osborne is in charge of the eye department.

The ophthalmic world suffers a distinct loss in the recent death of Dr. Wilbur Marple of New York who was for many years surgeon to the New York Eye and Ear Infirmary. Dr. Marple died suddenly of cerebral hemorrhage at the age of 60.

Dr. Robert Scott Lamb announces the removal of his office to Stoneleigh Court, Washington, D. C.

Dr. A. E. Prince of Springfield, Ills., will hold an operative eye clinic at Fort Smith, Arkansas, October 1. The occasion is the meeting of the Southwestern Medical Society.

Prof. A. Charpentier of Nancy, France, is dead at the age of 64. Among his contributions to the physics of light is a noteworthy book on "Vision from the Standpoint of General Medicine."

It is estimated that there are now 35,000 blind persons in France. The library for the blind in Lyons contains 400,000 volumes; but owing to the bulkiness of books in Braille type this represents much less reading matter than the number of books would suggest. A dictionary for the blind is being planned under the editorship of Anatole France.

The amenities of warfare occasionally seem to affect even ophthalmic literature. A well-known professor of ophthalmology, residing less than a thousand miles from Budapest, recently wrote for an equally well-known journal on the subject of military injuries of the eye. In the course of his hospital investigations he found fewer bayonet stabs of the face and eye than he had a right to expect, though other traumatism of the face were quite frequent. He suggests, as an explanation, that although there were few such stabs among the ranks of his own countrymen, they were probably quite common in the ranks of the enemy, obliged to suffer the unerring bayonet attacks of his own heroic and efficient soldiery. When, however, this article was reviewed by an ophthalmologist in another and enemy country it was pointed out by him to the Herr Professor that if he had examined the gluteal regions of the home troops, he would *there* have discovered the misplaced stab-wounds!

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) H. N. Lyon (P.-G.) A. G. Wipperf (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Poli.) Richard S. Pattillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wipperf (E.E.N.T.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wipperf (E.E.N.T.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Kemmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) D. W. Ess (Inf.) R. Crossley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) *Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) C. W. Ess (Inf.) D. W. Ess (Inf.) E. R. Crossley (Inf.) S. L. McCright (C.C.S.) Oliver Tydings (E. E. N. T.)	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Kemmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) C. W. Ess (Inf.) D. W. Ess (Inf.) E. R. Crossley (Inf.) S. L. McCright (C.C.S.) Oliver Tydings (E. E. N. T.)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) C. W. Wood (St. Luke's) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Lehensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Kemmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenbeer (Inf.) C. W. Ess (Inf.) D. W. Ess (Inf.) E. R. Crossley (Inf.) S. L. McCright (C.C.S.) Oliver Tydings (E. E. N. T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCright (C.C.S.) Robt. Von der Heydt (Inf.) C. A. Leenbeer (Inf.) C. W. Ess (Inf.) D. W. Ess (Inf.) E. R. Crossley (Inf.) S. L. McCright (C.C.S.) Oliver Tydings (E. E. N. T.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

County: Cook County Hospital, W. Poli.; Chicago Polyclinic and Hospital, Harrison and Wood Streets.
 Cook County Hospital, 1416 St. Luke's.
 C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.
 E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.
 Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets, N. W. U.; Northwestern University, 2431 Dearborn Street.
 Poli.: Chicago Polyclinic and Hospital, 221 W. Chicago Avenue, P.-G.; Post-Graduate Medical School of Chicago, 2400 Dearborn Street, N. W. U.; Northwestern University, 2431 Dearborn Street.
 Rush: Rush Medical College, W. Harrison and Wood Streets.
 St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.
 U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE OPHTHALMIC RECORD

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CONGENITAL GLAUCOMA AND SOME ALLIED CONDITIONS.

BY
LT. COL. R. H. ELLIOT.

I. M. S. RETIRED.

Hon. Fellow of the American Academy of Ophthalmology and Otolaryngology, and of the Minnesota Academy of Ophthalmology,
Hon. Member of the Chicago Ophthalmological Society,
of the Pacific Coast Oto-Ophthalmological Society,
and of the Detroit Ophthalmological Club.

Congenital glaucoma has figured in ophthalmological literature for nearly one and a half centuries. Excellent reviews of these records of the condition are given by Pyle⁵³, Parsons² and others.

Much discussion has taken place as to the best name for the disease. There can, we think, be little dispute that the correct appellation is "congenital glaucoma," for this has not only a definite pathological significance, but it also, with certain limitations, expresses a clinical fact. The matter will be alluded to again later. The principal objection to the term is its clumsiness, and therefore for purposes of convenience, we may speak of the disease as "buphthalmos" or "hydropthalmos." Of these the former is perhaps the preferable, as it commits us to no theory and has the sanction of very long usage.

To one, who sits down to study the voluminous literature of congenital glaucoma, it comes with something of a shock of surprise to find how widely different are the viewpoints of various writers. It therefore seems necessary, at the very outset, to clarify one's ideas by committing oneself to definitions, which shall be as precise as possible. From birth to advanced senility, no year of life is secure against the attack of one form or another of glaucoma, but surgeons have recognized broad distinctions, which serve to divide the disease into three great groups, viz., (1) congenital glaucoma, (2) juvenile glaucoma and (3) senile glaucoma. It is easiest, and we think it most expedient, to deal with the poles of life first, and then to group under juvenile glaucoma every case which we cannot include in one or other of the previous classes.

Congenital Glaucoma. By this we understand glaucoma which is *congenital in origin*. A large percentage of such cases are congenital, not merely in origin, but also in the manifestation of the condition present. The difficulty in their correct classification depends on the following factors—(1) Some parents are unobservant and fail, especially with first babies, to recognize what is obviously an abnormal condition of the eyes, whilst others are reluctant to admit any defect in their offspring. (2) Not a few of the cases require careful inspection and examination for their diagnosis in the earlier stages; a slight enlargement of the cornea, and a deepening of the chamber may be all that there is to see, and for one reason or another, expert advice may not be called in until months or years have passed. (3) The congenital defects, which lead to glaucoma, vary enormously in grade; some are so well marked, that a condition of distension of the eye is pronounced at birth and progresses rapidly in the years that follow it; in others, the changes may be so ill-defined as to lead only very gradually to the development of signs and symptoms of glaucoma. Such cases are classified *clinically* as “juvenile glaucoma.”

Senile Glaucoma. When we speak of “senile glaucoma,” we understand that form of the disease, which occurs in patients, who are sufficiently advanced in life to have developed those changes, whether anatomical or physiological, which either predispose to or excite an attack of hyper-tension in the eye. Senility is, however, a relative term, and there is a deep underlying physiological truth in the saying that “a man is as old as he feels.” We know well in our daily experience that one man will present before he is 40 more pronounced stigmata of senility, than another will show at 60. How then can we fix an arbitrary line, where juvenile glaucoma is to cease and senile to begin? Nor is our problem merely one of the advance of degeneration, for as Priestley Smith has shown, the size and build of the eye, and the continuous growth of the lens, are determining factors of very great importance.

Different writers have adopted different standards. Some have considered everything below the age of 35 as juvenile glaucoma, others have taken 40 as their limit. The exact figure we accept matters little, so long as we recognize, that at one pole of life we are dealing with defects of congenital origin, which must at a comparatively early age manifest themselves by glaucomatous symptoms, whilst at the other pole lie a number

of cases, the great majority of which are eventually dependent for their genesis on the degenerative processes associated with advancing age. Running through the whole like the woof of the texture is the great factor of the departure of the eye from its anatomical ideal.

If we could judge all cases in the perfect light of full anatomico-pathological knowledge, we could scientifically classify our glaucomas into (1) the congenital i. e. those due to prenatal defects in the normal development of the excretory passages of the eye: (2) those in which the degenerative processes, associated with senility, play the leading part: and (3) those in which the anatomical configuration of the eye is such, as to pave the way for the onset of glaucoma, with a minimum of assistance from the processes of senile degeneration. Unfortunately we have in most cases no means of obtaining such exact knowledge during life: and on the other hand, it is often a question of the interplay of many factors and not of the evolution of one alone. Thus into the juvenile group, there creep at the one end the slighter congenital cases, and at the other end the more exaggerated instances of structural mal-development. The outcome is a confusion, which is rendered worse confounded by the fact, that not one, but many observers have taken a hand in the classification of the cases, and that some, at least, of these have not fully appreciated the difficulties of the task.

It remains then for us, whilst constantly aiming at the attainment of a scientific classification, to bear carefully in mind, that the insufficiency of our data too often renders our conclusions open to the suspicion of inaccuracy. To remedy this it is desirable to multiply both clinical and pathological observations, and especially the latter.

SIGNS AND SYMPTOMS OF BUPHTHALMOS.

Buphthalmos probably always dates from birth, even in so far as its clinical manifestations are concerned, though many of the cases are overlooked in their earlier stages. Gros¹ found in forty-five collected cases, that the condition was noticed at or immediately after birth in 60% of them, within the first year in 13.3%, from the first to the third year in 17.7% and later in 8.8%. In dealing with the aetiology and pathology of the question, we shall show reason to believe, that buphthalmos is dependent on a defective development of the parts concerned in excretion. It is well known that such defects may be

slight or severe. These facts afford a ready explanation of two things, viz.: (1) that slight cases of buphthalmos are not always recognized at birth, and (2) that not a few cases of juvenile glaucoma are really buphthalmic (i. e. due to defective development) in origin.

The condition is bi-lateral in the great majority of cases. Gros gave the figure for those affected on both sides at 63.7%. Amongst the uni-lateral cases neither side is favoured.

The practically unanimous consensus of opinion is that boys are much more frequently affected than girls, thus supporting Gros' figures of 61.2% in the former and 38.8% in the latter.

The eye enlarges slowly but steadily and may attain enormous proportions. The most striking feature of the disease is that the whole globe becomes uniformly distended. This is due to the even distensibility of the structures, which is characteristic of childhood. The eye assumes the shape of a much elongated oval, and may fill up all the available space in the orbit, thus leading on the one hand to marked proptosis and on the other to great limitation of ocular movement.

We may now take the structures *seriatim*.

The Cornea. No feature of this disease is more striking than that of the enlargement of the corneal base. It is this, combined with the general enlargement of the globe, which has earned for the condition the title of buphthalmos or ox-eye. The cornea appears hemispherical or globular, the anterior chamber being thereby very greatly deepened. Some idea of the deformity produced may be gathered from the fact that measurements of corneal diameters of over 23 mm. are on record, and that a maximum depth of the chamber of 12.8 mm. as against a normal 2.6 mm. has been observed (Parsons²). In association with the increase in the corneal diameter, there is a marked flattening in curvature.

The cornea may be clear and lustrous, or may be the seat of various forms of opacity; thus (1) it may be steamy and dull, due to a congestive condition of the globe, strictly comparable with that which is found in senile glaucoma; (2) opacities may be present due to the over-stretching and rupture of Descemet's membrane at various points; Stähli⁷⁸ has calculated that central opacities due to this cause, are responsible for an impairment of vision in from 33% to 50% of all cases of buphthalmos; (3) there may be ulceration or degeneration

of the surface of the cornea due to defective nutrition and to exposure; and (4) cicatricial changes may be present as a result of some earlier active inflammatory process.

The ruptures of the membrane of Descemet are of sufficient interest, to justify a short description of their clinical appearances. They are, however, not pathognomonic of buphthalmos, for they are seen, though more rarely, in cases of high myopia of conical cornea and, it is said, of instrumental birth injuries to the cornea. During life they appear as fine lines, which sometimes branch dichotomously. They are delicate and almost transparent, so that good illumination and examination with the loupe are necessary for their discovery: they are most easily seen against the background of the black pupil. On ophthalmoscopic examination with a high convex lens, they stand out against the fundus reflex as dark, double-contoured streaks with a red line in the middle. The light and shade on them alter with slight movements of the ophthalmoscope (Coats⁷⁴). Haab compared them to a thread of Canada balsam laid on a glass slide.

In some cases the enlargement and the proptosis of the globe are so extreme that the lids meet with difficulty or not at all. The condition of lagophthalmos so produced is a menace to the safety of the organ, owing to the exposure of the cornea.

The Anterior Chamber. It has already been said that the anterior chamber is greatly deepened in buphthalmos. At the same time the angle appears (we advisedly say "appears") to be widely open. This matter will be better discussed under the heading of pathology. It remains to mention, however, that in certain cases of this affection, the anterior chamber instead of being deepened is narrowed or even obliterated. It is probable that these cases do not belong to the same aetiologic class as the commoner ones, which are to be attributed, as has already been said, to defects in the development of the parts concerned in excretion.

The Sclera is nearly uniformly distended in buphthalmic eyes. The result is that the uveal pigment shows through the thin coat, giving the white of the eye a bluish appearance. This is most marked in the neighborhood of the limbus, where the stretching and consequent thinning of the coat are most pronounced. In some eyes, however, the sclera is found to be thickened, owing to hyperplasia, instead of being thinned.

Staphylomata are rarely found to be present, their occurrence being then merely accidental.

The Iris is very often tremulous, owing to lack of the usual support from the lens. It is rare to find any evidence of inflammation, but the pattern is often wanting in distinctness, the colour dull and the lustre impaired. Owing to the displacement backward of the lens system, the plane of the membrane, instead of being convex forward, is usually flat or even somewhat concave forward (funnel-shaped). The typical buphthalmic pupil is round, and is often a little dilated, though rarely it may be normal or even contracted. The pupillary reactions are present, but are decidedly sluggish, sometimes very markedly so: this is to be ascribed to atrophy of the iris tissue, which likewise explains the changes in its appearance enumerated above. Drug mydriasis can readily be obtained, as also can meiosis, up to a comparatively late stage of the disease. Colobomata of the iris and choroid would appear to be not very uncommon.

The Lens is the only ocular structure which is not distended by the increase of intra-ocular pressure, and that for the obvious reason, that this pressure acts upon it from without and not from within. It is usually clear in the early stages, though often cataractous later; it may be of natural size, but is often smaller than normal. On antero-posterior section it presents a spindle shape: this is usually explained by the pull of the over-stretched suspensory ligament.

It is obvious that the latter ligament must be put under a condition of strain, from the time that the corneal base first commences to enlarge, and that in advanced cases, the over-stretching must be very extreme, and must lead to loss of elasticity in the suspensory fibres, and later still, to their rupture. The alteration in the anterior segment of the eye, which we have already discussed, leads to the lens system finding a position further away from the cornea; this is equivalent to a displacement backward of this system. It is stated by Parsons² that in addition to the above, there is a slight displacement backwards of the origin of the suspensory ligament in the ciliary body, brought about by the stretching of the globe. At the same time, the lessening in the firmness of the support afforded to the lens renders that structure tremulous and so leads to irido-donesis. In extreme cases, the zonule may rupture, and the lens consequently become dislocated.

The Vitreous is usually clear in early cases, but later on in the disease, at a time when the retina and the choroid have been affected by the over-stretching of the globe, it is common to find floating opacities present. Sometimes they are in such numbers, as to make it very difficult to obtain a clear view of the fundus.

The Choroid, in early cases, appears to be quite normal. Later as the globe stretches, it shares in that stretching, and presents the appearances which we are accustomed to find in the over-distended globes of highly myopic patients. Not only so, but evidence of changes in the uveal coat, is to be discovered in the abundant vitreous opacities, which veil the fundus details from view in late cases.

The Retina is doubly affected, viz., (1) by overstretching, and (2) by the increase in the intra-ocular pressure. We are familiar with the diminished sensibility of the retina which we meet with in high myopia, and which is usually attributed to the abnormal stretching of the membrane; it must be remembered, at the same time, that there are those who ascribe the unhealthy stretching of myopic globes to an increase in intra-ocular pressure. Nor are we likely to forget that overstretching involves a risk of detachment of the retina. With regard to the second of the two factors above enumerated, the subject has been dealt with, at length by the writer, in a recent article in the *Ophthalmic Review* (Oct., 1915), and is too large to be again discussed here. Suffice it to say, that what has been written of glaucoma in the adult applies with equal force to buphthalmos, with one important reservation, which will now be set forth. In the adult eye, the investing tunic has attained a texture and a power of resistance, which prevents it from stretching to any great extent under the influence of an increase in intra-ocular pressure. Under the strain of long continued high tension the adult globe will give at its weakest parts, viz., the intercalary area, the apertures of emergence of the vasa vorticosa, and the optic disc. With the exception of the last-named, which, however, affords very little relief to the pressure present, the yielding of a senile globe is a very slow affair. In the young eye, on the contrary, the whole globe gives before the onset of pathologic pressure, and by so doing, it is held that it keeps the results of the process at bay. To put it colloquially it is Nature's effort to meet the advancing foe, by

"yielding to conquer." That some eyes win through to a measure of saved vision is certain, but the greater number yield in the end to the relentless pursuit of the enemy, unless help is available from without. It is the old, oft-told and melancholy story of "the little nation," battling against odds, whilst waiting for the arrival of relief, an epic, as interesting in surgery, as it is gallant in a down-trodden and heroic country.

The Optic Disc is cupped in buphthalmos, just as it is in senile glaucoma. Essentially the process is the same in both, though in the latter it may be to some extent delayed by the general yielding of the globe. It is, moreover, not always an easy thing to see the exact condition of the papilla, through the myopic refraction, and the hazy media of a case in a late stage. The brilliant whiteness, due to advanced atrophy, is then much more easily detected than are the details of the cupping of the disc.

The Tension of buphthalmic eyes is raised; sometimes, and in late cases, it is very markedly so. Owing to the alteration in the curvature of the cornea, the ordinary Schiötz tonometer, is unsuitable for recording the intra-ocular pressure in these cases. We have therefore to fall back on the very unsatisfactory method of digital examination. The stretching of the globe, the cupping of the disc, and other signs seldom, if ever, leave any doubt as to the presence of increased tension.

The Visual Acuity is very rarely normal in buphthalmos and is often much impaired. This is readily understood when we consider the numerous causes that may contribute to such a result, viz., (1) opacities of one kind or another in the cornea; (2) cataract; (3) vitreous opacities; (4) damage to the optic nerve and retina (including retinal detachment); and (5) interference with the normal refraction of the eye. The last of these alone remains to be discussed.

From analogy with cases of high myopia, we should certainly have been justified in expecting that the great increase in the size of the globe, and especially in its length, would cause images to be focussed far in front of the retina, in other words, that a condition of high myopia would be imitated. When we consider that the measurement of a number of buphthalmic eyes by Gros¹ yielded a mean of 32 mm. in antero-posterior diameter, it would seem impossible that any condition, save one of high myopia, could prevail, and yet modern experience

would appear to be practically unanimous that in the majority of cases, the myopia present is very moderate in amount. Indeed in rare cases emmetropia and even hyperopia have been recorded by reliable observers. Parsons² states that a defect of from $-1D.$ to $-7D.$ is relatively common, and he ascribes this diminution of the expected short sight to three factors: (1) flattening of the cornea; (2) displacement backward of the lens system; and (3) flattening and consequent loss of power of the lens itself.

Astigmatism is common and is usually found to be with the rule, thus suggesting that the horizontal meridian of the cornea flattens more than the vertical under the influence of stretching. Irregular astigmatism is not uncommon and may be due either to the condition of the cornea, or to a tilting or a partial dislocation of the lens. The correction of buphthalmic cases is usually difficult and not infrequently impossible, since the conditions present make a retinoscopy very difficult to perform; nor are these difficulties rendered any the less by the fact that the patient's power of fixation is often indifferent and that nystagmus is not seldom present.

General. Buphthalmic children are naturally backward and diffident. If the corneas are exposed, pain frequently makes them fractious and irritable. The limitations in the movements of the eyeballs necessitate constant turning movements of the head, which impart a characteristic staring look and a somewhat stilted attitude to the patient. The proptosis renders the eyes very liable to damage and the children consequently shun the rough companionship of their fellows. Taken all round the lot of these little people is a very hard one.

CLINICAL COURSE AND COMPLICATIONS.

In the great majority of instances, an untreated case of buphthalmos goes steadily downhill. The distension of the eyeball increases, bringing in its train the various consequences which we have detailed in describing the signs and symptoms of the disease. On the one hand, we have all the troubles associated with the altered relationships between the globe and the surrounding parts. The proptosis and consequent deformity increase. The cornea may be deprived of the natural protection of the lids, and so become liable to abrasion, ulceration and even perforation, with consequent panophthalmitis. The increasing limitation of the ocular movements and the pressure on the surrounding parts may be productive of great

inconvenience to the patient. On the other hand, the all-important structures of the eyeball itself tend to become steadily disorganized. The media lose their clearness, the retina forfeits its sensibility, and sometimes undergoes detachment, whilst the optic nerve atrophies and loses its function. To this miserable story of progressive ruin there are, however, exceptions. Cases have been published by Axenfeld³ and others, in which spontaneous recovery from the disease has been claimed to have taken place. More correctly speaking, the progress of the condition has come to a stop. Collins & Mayou⁴ have suggested, that the explanation of this arrest is to be sought in the stretching or tearing of the congenital bands, in the neighbourhood of the angle of the anterior chamber. They think that possibly in this way, the channels of excretion are opened up and the cause of the condition is thus removed. Fage⁵ has pointed out that in those cases, in which a cure of buphthalmos has been claimed as the result of administration of meiotic drugs, a much more reasonable explanation would have been, that a favorable ending of the cases would have taken place, whether the drugs had been used or not. It, however, does not seem impossible, that the production of prolonged meiosis may have favoured the happy result by helping to tear the bands to which we have alluded. This is admittedly only a speculation.

The buphthalmic eye is very liable to injury. Subconjunctival ruptures have been reported both by Blain⁶ and Höeg⁷. Such cases appear to do well under a pressure bandage. Ball⁸ records the dislocation of one of these large eyes, owing to a blow against the knob of a chair. It was replaced and sutured in position, but later atrophy took place. A stranger accident still is that recorded by Bunge⁹, in which a detachment of the retina and subluxation of the lens followed a jar to the patient's body. Dislocations of the lens are unfortunately far from uncommon, either with or without a history of injury to the eye.

Buphthalmos and Neuro-Fibromatosis. Fuchs¹⁰ asserts that buphthalmos may be a symptom of neuro-fibromatosis multiplex (Reeklinghausen's disease), which is compounded of a number of changes mostly congenital, viz., multiple neuro-fibromata, mollusca fibrosa and flat pigment moles in the skin; neuroma plexiforme and lymphangioma of the lids and orbit, and unilateral hypertrophy of the face; lastly tumors of the optic and auditory nerves. Komoto¹¹, Weinstein¹² and Murak-

ami¹³ have each published a case of the kind, in all three of which neuro-fibromatosis played a very prominent part. In two at least of the cases, an unilateral affection of the face on the same side, would appear to have been present.

Cabannes¹⁴ met with a case of congenital buphthalmos with striking right-sided hemi-hypertrophy of the face and without obstruction to the excretory passages. He thought the enlargement of the eye dependent on a condition of hyper-nutrition, caused by a large deep-seated angioma of the temporal region. An allied case would appear to be that of Cuperus¹⁵ in which a right-sided buphthalmos co-existed with an extensive teliangiectasis, which involved the right eye and right lower lid.

We turn now to the cases published by English writers. These have been comparatively numerous, and some very careful work has been done on the subject. Collins' & Batten's⁶⁷ case led the former to review a number of previous instances of the affection, viz., those by Alexis Thomson⁶⁸, Sachsälber⁶⁹, himself and Snell⁷⁰, Rockcliffe and Parsons⁷¹, and himself and Marshall⁷². After detailing the changes that have been found in connection with neuro-fibromatosis, he states that all portions of the ciliary nerves supplying the eye may be affected, and that in the uveal tract, as in the skin, there may be a general hyperplasia of the fibrous tissue. The extent of the affection varies in its distribution, sometimes being confined to one set of ciliary nerves, and to the parts supplied by them, and sometimes to another. In some cases, only the terminal filaments and end organs of the nerves are involved; in others the larger trunks are also affected. Microscopical sections show a marked increase of the perineurium, and endoneurium. The affected nerves may present, even to the naked eye, an appearance of enlargement and of plexiformity.

In Sutherland's & Mayou's case, which was shown as an example of v. Recklinghausen's disease, the right side of the face and head were enlarged: the branches of the third division of the fifth nerve could be felt as so many cords, the lids were hypertrophied, and at one point presented a swelling, which felt like a bag of worms; white streaks in the cornea were taken to represent enlarged ciliary nerves: the tension was up, and the disc cupped. The affection dated from six months of age. Verhoeff⁷³ has stated, that in a case which came under his observation, a number of tortuous, worm-like bodies could be seen clinically on the surface of the eyeball.

The question arises, whether the enlargement of the globe is directly connected with the neuro-fibromatosis, or whether it is due as is the case with other instances of buphthalmos, to some maldevelopment of the channels for the excretion of intra-ocular fluid. Collins appears to incline to the latter view, but does not dogmatise on the subject, and we shall be well advised to imitate his example. Without committing ourselves to any definite expression of opinion, we must at least keep before us the possibility, that the aetiology of these cases may prove to be quite distinct from that of ordinary buphthalmos.

DIFFERENTIAL DIAGNOSIS OF BUPHTHALMOS.

It has been said by various writers that it is necessary to make a differential diagnosis between buphthalmos and the following conditions: (1) megalocornea; (2) juvenile glaucoma; (3) keratoconus; (4) keratectasia; (5) staphyloma; (6) exophthalmos.

We will take these in turn:

(1) Megalocornea is dealt with in a separate section.

(2) There is no hard and fast clinical line between buphthalmos and certain cases of juvenile glaucoma; the pathological dividing line need not detain us now.

(3) In keratoconus it is the centre of the cornea which yields, and in advanced cases the appearance, looked at from the side, is characteristic. Further the condition is one which begins to develop in the second decade of life, and not in the first part of the first decade. Most important of all, the base circle of the cornea is not enlarged, as it is in buphthalmos.

(4 and 5) It is difficult to believe that anyone, grounded in the elements of ophthalmology, could mistake the opaque protrusions of keratectasia, or of staphyloma, for buphthalmos, save possibly at a very late stage of the last-named, when the differential diagnosis would be quite unimportant.

(6) The exophthalmos associated with congenital glaucoma is only seen when the disease is far advanced, and is accompanied by such unmistakeable enlargement of the cornea, that no difficulty in diagnosis would then be possible.

THE PATHOLOGICAL ANATOMY OF BUPHTHALMOS.

In studying the pathological anatomy of buphthalmos, we must take the various structures of the eye in turn.

The Cornea is usually of normal thickness at its centre, whilst its periphery is always found to be thinned, and often to be cellular and vascularised. It is the weak sclero-corneal

junction which gives way under pressure from within, and thus bodily displaces the cornea proper forwards; at the same time the base-circle becomes stretched, and flattening of the cornea results (Parsons²).

As has already been mentioned, we find in buphthalmic corneae, systems of fine lines, which are due to the over-stretching and rupture of Descemet's membrane. The whole subject has been exhaustively dealt with by George Coats⁷⁴. In some cases the membrane is merely thinned without actual rupture having taken place. In others, the rupture appears to have been sub-endothelial, though in all probability the endothelium gave way at the time of the break and subsequently closed in and covered the injury. In some instances, the edges of the membrane remained flatly applied to the cornea, though they may become widely separated from each other by subsequent stretching. More usually one or both edges show a tendency to roll forward in the manner commonly observed after traumatic ruptures. A definitely spiral arrangement may thus be initiated. Cases are on record, in which the tearing was so excessive, that excrescences appeared on the posterior surface of the cornea, formed by the curled up margins of the lacerated membrane. Such have been described both by Coats⁷⁴ and Rumschewitsch¹⁶. With regard to the mechanism, whereby ruptures are produced, observers are agreed, that the stretching of the cornea is the essential cause, but as Coats points out, all the phenomena observed indicate that the membrane of Descemet is less elastic and more brittle than the lamellae of the cornea; otherwise, it would not tear as it does, and it would not tend to roll up when torn. Experiments on animals have failed to reproduce the characteristic tears, doubtless due to the fact that the over-stretching in these cases is far too suddenly applied.

Apparently equally as common as the foregoing changes, (though they have attracted less interest, since their genesis has always been obvious), are lesions of the front of the cornea, including Bowman's membrane and the deeper layers. These are a result of trauma of one kind or another. In addition, Takashima¹⁷ has described an interstitial infiltration of the cornea, causing in places breaks in the continuity of Bowman's membrane. These resemble the tears in Descemet's membrane.

The Iris and the Angle of the Anterior Chamber. In very many cases of buphthalmos, the only points observable in the

iris are those atrophic and degenerative changes, which are equally found in eyes removed for senile glaucoma. There are, however, not a few cases in which bands varying in density, in breadth and in numbers, stretch across and tend to occlude the angle of the anterior chamber. Round the nature of the origin of these bands a long and vigorous controversy has raged. The earlier view was that they were inflammatory in origin, and indeed for a limited number of cases, this conclusion may be taken to be generally accepted as correct. It applies, however, only to a minority of buphthalmic eyes, for Treacher Collins¹⁸ has shown that these bands, in most cases, are the representatives of a persistent foetal condition of the pectinate ligament. The case may be summarized thus: (1) In the lower mammals, the pectinate ligament is a much larger and more elaborate structure than it is in man. (2) It is divided up in them into two parts, viz., (a) an outer part, which persists in man as the pectinate ligament, which latter has been described by Arthur Thomson¹⁹ as being fashioned by the breaking up of Descemet's membrane into a number of fibrillae, arranged in brush-like fashion, to form a triangular area of trabecular tissue; and (b) an inner part, presenting large cavernous irregular intercommunicating spaces, the so-called "spaces of Fontana." (3) The very same condition of the parts is found in the human foetus, but undergoes considerable modification before birth, for the spaces of Fontana disappear, and their place is taken by an extension outwards of the angle, or sinus, of the anterior chamber. Should some of the partitions between the spaces of Fontana persist postnatally, they present the appearance of the bands, cords, etc., which have so often been described by pathologists, as filling up the space at the angle of the chamber in buphthalmic eyes.

It is stated, that in some cases Descemet's membrane does not split up at all to form the pectinate ligament, but that it is continued round on to the anterior surface of the iris. The ciliary muscle then takes origin from the sclera, to which also the root of the iris has been found attached.

It is of interest to remember, that the obstruction to excretion may be present in eyes, which have a deep chamber and an *apparently* widely open angle. It is only when microscopic examination is made, that the true condition of things reveals itself.

Many minor congenital defects of the uveal tract have

been described as occurring in buphthalmic cases, including coloboma of the iris and of the choroid, corectopia, ectropion of the iris and aniridia. This is only what might have been anticipated, when dealing with a condition, which is so essentially dependent upon a fault in development, as buphthalmos undoubtedly is.

The Canal of Schlemm has been found to be absent or imperfectly developed in a very large number of buphthalmic eyes, which have been submitted to microscopic examination. These observations have been multiplied by many workers in many lands. The names include those of Rumschewitsch¹⁶, Gross²⁰, Seefeldt²¹, R. Cross²², Mayou²³, Stimmell and Rotter²⁴, Christel²⁵, Spielberg²⁶, Nahmacher²⁷, Boehm²⁸, Zentmayer²⁹, Hamburger³⁰ and others. The last-named surgeon has estimated that a defect in Schlemm's canal is to be found in 50% of cases of buphthalmos.

In this connection, it is interesting to record that Rumschewitsch and others have in certain cases observed not merely a defect in or absence of the canal of Schlemm, but a similar want of development of the veins in the anterior segment of the globe. The significance of this observation is obvious, when we remember the intimate developmental and physiological relationships between the canal of Schlemm and its tributary vessels.

The Sclera. Judging from a general review of the literature of the subject, one would conclude that in the majority of cases, the sclera has been found to be thinned; exceptional instances have, however, been recorded, in which a definite hyperplasia of this membrane had taken place, with the result that its thickness was greater than that found in the emmetropic eye.

The most recent work on the subject is that of Takashima¹⁷, who devoted a good deal of attention to the measurements of a number of buphthalmic eyeballs, which he examined anatomically. He found that, while the enlargement of the globe was associated with thinning of the anterior part of the sclera, the posterior segment, not only was not thinned, but was usually thickened in comparison with the normal sclera of the same age. He maintained that an analysis of the cases found in literature bore out the correctness of his measurements. In a few cases the posterior segment of the sclera may be thinned,

but here, according to Takashima, the true explanation is that the disease is complicated by intercurrent myopia and staphyloma. His view, though he did not press it strongly, was that the enlargement of the globe was to be looked upon, in part at least, as a giant overgrowth of the eyeball, and not simply as a result of stretching.

It is the intercalary region, which gives way most under pressure, and in association with this, there is said to be a definite setback of the plane of the lens system.

The enlargement of the eye is sometimes very great, thus Coronat and Aurand³¹ record a buphthalmic globe, which measure 44 mm. by 30 mm.

The Ciliary Body usually gives evidence of atrophy and degeneration and sometimes of past inflammation.

The Vitreous is often found to be abnormally fluid, as well as being cloudy.

The Ocular Muscles, and even the **Lids**, have been found atrophic and partially paralysed.

THE AETIOLOGY OF BUPHTHALMOS.

It has long been recognized that in the great majority of cases at least, buphthalmos is due to an obstruction to the channels of excretion of intra-ocular fluid. Bentzen and Leber⁷⁶ proved by experiments on a buphthalmic eye, that the rate of filtration from it was below the normal. The anatomical evidence we have discussed provides ample explanation as to the nature of the obstruction. In the earlier years of the study of this subject, pathologists were inclined to explain the anatomical phenomena on the basis of intra-uterine inflammation. Collins¹⁸ work abundantly confirmed by that of others, has, however, satisfied most ophthalmologists, that in the majority of cases we have to deal with a condition brought about by an arrest in development rather than with the results of an inflammatory process. It is, however, possible, nay more it is probable, that in a minority of instances intra-uterine inflammation is to blame for the condition. Abadie held strongly that buphthalmos was always the result of a specific choroido-retinitis, whilst other writers, including Planchu and Gautier³², S. Stephenson³³, Horton Brown³⁴, and Mayou²³ have traced a history of inherited syphilis in their cases. Zentmayer³⁵ attributes the great frequency of buphthalmos in negro children, to the prevalence of congenital syphilis amongst them.

The suggestion that hyper-secretion may be the cause of buphthalmos would appear to have little to recommend it. Such evidence as is afforded by the condition of the ciliary body is all against such an assumption. Nevertheless so reliable an authority as Fage⁵ has quite recently championed the view, that a hyper-secretion, of vasomotor origin, may be the cause of some of the buphthalmic eyes with which we meet.

It is universally agreed that heredity plays an important rôle in the causation of buphthalmos, but exactly what that rôle is, it is impossible to say. That it acts through inherited disease alone is, we think, a view which may be unequivocally rejected, in spite of the strong support, with which it has met from time to time. It is probable that the main factor is the tendency to defective development, and that disease plays a subsidiary and a comparatively infrequent part. Consanguinity has come in for a share of suspicion in this as in so many other congenital conditions.

From time to time, cases are published, in which buphthalmos is stated to have followed an injury to or an inflammation of the eye. In most of these, the condition is probably quite distinct from that of congenital glaucoma; they really are instances of secondary glaucoma occurring in young and therefore distensible eyes. It is possible that in a few of them, the existence of a congenital want of development of the excretory passages may determine that the effects of injury or of inflammation shall suffice to upset the balance between secretion and excretion, and may so precipitate the onset of an attack of glaucoma. Clinically speaking, they are instances of buphthalmos, or ox-eye, but pathologically it is very doubtful if any congenital defect plays a part in the genesis of the great majority of them. It is a question of our use of the terms.

EXPERIMENTAL BUPHTHALMOS.

Paul Erdmann³⁶ in 1908 was able to produce glaucoma in the rabbit's eye by introducing into the anterior chamber a thin steel needle, which formed the positive electrode for a current of 5 MA. The source of the glaucoma was an obliteration of the filtering angle, by the proliferation of the endothelium, caused by minute granules of oxide of steel. In his later experiments, he introduced the prepared electrolytic products into the chamber, and so was able to regulate the reaction.

(Continued.)

A CASE OF REFRACTION DEMANDING CYLINDERS CROSSED AT OBLIQUE AXES TOGETHER WITH THE THEORY AND PRACTICE INVOLVED

BY
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This article is called forth by virtue of the fact that the writer has been referred to upon several occasions during the past two years by practitioners upon the eye and by manufacturing opticians for the sphero-cylindric equivalents of prescriptions involving double cylinders at oblique axes. Likewise the extremely interesting refractive case to be reported upon in the following paragraphs was sent to him some months ago, with the request to determine upon a correction which would give as nearly normal vision and ocular comfort as possible.

It is to be said by way of introduction that prescriptions involving cylinders crossed at oblique axes are rarely encountered, and it may likewise be stated that such corrections, when found, are often due to lack of skill and technique on the part of the practitioner; they do exist, however, and when they do must be classed as cases of peculiar irregular astigmatism due to corneal defects (ectasia corneæ), such as conical cornea or displacement or turning of the lens (ectopia lentis).

Theoretical.

It is not feasible within the limited space of this article to develop the mathematical theory of the dioptric formulæ for combinations of cylinders with axes at any angular deviation. This has been admirably done by C. F. Prentice, M. E., in his work on Ophthalmic Lenses (he will doubtless include these developments in the section on Lenses to be published in Volume IX of the American Encyclopedia of Ophthalmology), and again by the writer of this article in a brief and possibly much simplified form in the Physical Review and in the Optical Journal and Review published in 1914. In succinct form the equations as developed by the writer are:

$$(1) \quad X = d_1 \cos^2 \theta_1 + d_2 \cos^2 \theta_2,$$

$$(2) \quad Y = d_1 \sin^2 \theta_1 + d_2 \sin^2 \theta_2,$$

$$(3) \quad A + B = X + Y,$$

$$(4) \quad A \div B = d_1 d_2 \sin^2 \gamma,$$

$$(5) \quad (B - A) \cos 2\delta = Y - X.$$

The symbols have the following significances:

d_1 = dioptric power of first cylinder of the oblique-angled combination.

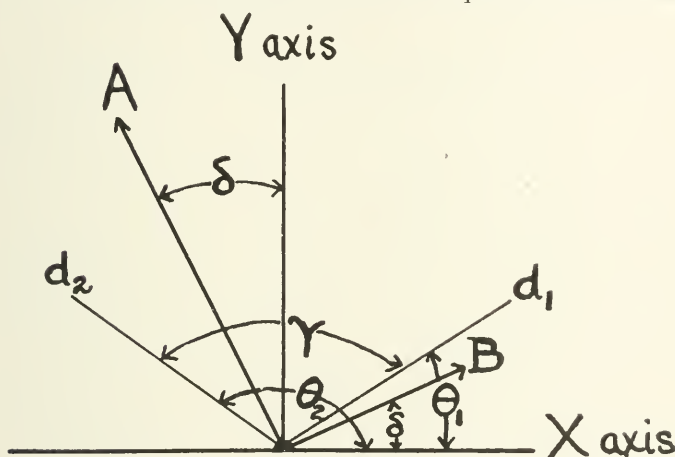
d_2 = dioptric power of second cylinder of the oblique-angled combination.

A = dioptric power of first cylinder of cross-cylinder combination.

B = dioptric power of second cylinder of cross-cylinder angled combination.

X = total dioptric power in the horizontal direction due to the two members of the oblique axis combination.

Y = total dioptric power in the vertical direction due to the two members of the oblique axis combination.



γ = angle between axis of the oblique combination.

δ = angle which one member of the right-angled equivalent combination makes with the horizontal line, $0^\circ - 180^\circ$ line.

θ_1 = angle which first member of oblique combination makes with the $0^\circ - 180^\circ$ line.

θ_2 = angle which second member of oblique combination makes with the $0^\circ - 180^\circ$ line.

Figure 1 is inserted in order to aid the reader of this paper in mentally placing the various angles and powers involved. No importance is to be attached to the actual dimensional values of the geometrical functions involved in this diagram; the drawing is inserted solely for illustrative purposes.

In the solution of equations (3) and (4) it will be found

that there are two numerical values which satisfy A and likewise two satisfying B . When these results are substituted in equation (5), the angle δ will be found to have a positive value when one set of values of A and B is used and a negative or minus value, algebraically considered, when the second set of values of A and B is used. A general rule relative to the angles at which the two members of the equivalent cross-cylinders are to be placed may be formulated as follows:—

If the solution of the equation $(B - A) \cos 2\delta = Y - X$ gives a positive value to the angle δ , then the cylindrical value of A used in the solution of this equation is to lie with its axis at the angular position indicated by δ ; if the solution of the equation gives a negative value to the angle δ , cylinder B lies at that angle.

In addition, complications will be avoided when the two cylinders at oblique axes have different signs if they are transposed first of all into an equivalent sphere combined with the two cylinders which should now have the same algebraic signs but one of the axes changed by 90° .

The solution of a simple problem, before passing to the particular case reported in this paper, may aid in a better understanding of the latter. We wish to convert 1.00 cyl. ax. 90° \supset + 2.00 cyl. ax. 20° into their cross-cylinder and sphero-cylindrical equivalents. In this problem

$$\begin{array}{lll} d_1 = +1.00 & \theta_1 = 90^\circ & \gamma = 70^\circ \\ d_2 = +2.00 & \theta_2 = 20^\circ & \end{array}$$

We wish to find the values of A , B and δ .

$$\begin{array}{l} \cos^2 \theta_1 = \cos^2 90^\circ = 0.0000 \\ \cos^2 \theta_2 = \cos^2 20^\circ = 0.8830 \end{array} \left| \begin{array}{l} \sin^2 \theta_1 = \sin^2 90^\circ = 1.0000 \\ \sin^2 \theta_2 = \sin^2 20^\circ = 0.1170 \\ \sin^2 \gamma = \sin^2 70^\circ = 0.8830 \end{array} \right.$$

Substituting these values in equations (1-4) in order, we have

$$\begin{array}{ll} (1) & X = 0.0000 + 1.7660 = 1.7660 \\ (2) & Y = 1.0000 + 0.234 = 1.2340 \\ (3) & A + B = X + Y = 3.00 \\ (4) & A \cdot B = 1 \times 2 \times 0.883 = 1.7660 \end{array}$$

Squaring equation (3) we have

$$(5) \quad A^2 + 2 A \cdot B + B^2 = 9.00.$$

Multiplying equation (4) by -4 we have

$$(6) \quad -4 A \cdot B = -7.064$$

Add equations (5) and (6) together and we get

$$(7) \quad A^2 - 2 AB + B^2 = 1.936$$

or (8) $A - B = +1.388$ or -1.388

and since $A + B = 3.00$

$$A = 2.19 \text{ or } 0.81$$

and $B = 0.81$ or 2.19

If we take B as 2.19 and A as 0.81 and substitute in equation (5), $(B - A) \cos 2\delta = Y - X$, then

$$(2.19 - 0.81) \cos 2\delta = Y - X = -0.542$$

$$\cos 2\delta = -0.395$$

$$2\delta = -66^\circ 50'$$

$$\delta = -33^\circ 25'$$

Therefore, applying the rule that a negative value of δ indicates that cylinder B , having the value which was taken for the solution of equation (3), is to lie at this angle, we have as our answer $+2.19$ cyl. ax. $33^\circ 25' \subset +0.81$ cyl. ax. $123^\circ 25'$.

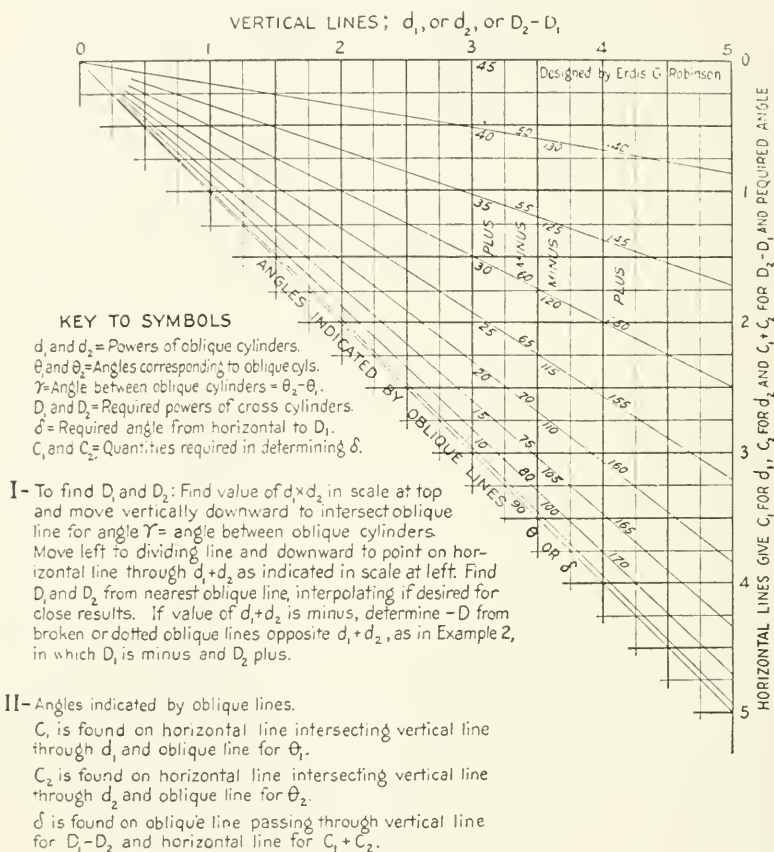
As a sphero-cylinder this is equivalent to 2.19 D. S. $\subset -1.380$ cyl. ax. $123^\circ 25'$ or 0.81 D. S. $\subset +1.380$ cyl. ax. $33^\circ 25'$.

Practical Case.

Mr. F. R. T. Aet. 25 yrs. Chief complaint is that there seemed to be a "veil", as he expressed it, in front of his face; also suffered from monocular (and therefor binocular) diplopia, seeing a second less distinct object. First noticed this effect some years ago when entering high school. Had been, to the writer's knowledge, in competent medical and ophthalmological hands. Gave no history of ulcers, traumatism, etc.; various other tests negative. Was wearing, O. D. 3.00 cyl. ax. 165° ; O. S. 2.25 cyl. ax. 45° . Without glasses the vision in each eye was less than $2/10$; wearing his correction the visual acuity, binocularly, was a little better than $3/10$. Placido's disc showed ellipses with long axes at about 180° in each eye; the ellipses were broken however. Ophthalmometric examination revealed the characteristic appearances of a case of badly irregular astigmatism; no position of the mires could be found where they formed anything like a continuous line. The nearest continuous meridian, O. D., was at 45° position, O. S. at 75° . O. D. showed ophthalmometrically 49 D. along 45° position, 43.5 D. along 135° , indicating 5.5 D. of astigmatism; O. S. showed 50.5 D. along 75° position and 47 D. along 165° , indicating 3.5 D. of astigmatism. Assuming, as is generally done, that the normal cornea should measure about 45 D., we see that the cornea of O. D. is approximately myopically astigmatic 5.5 D. and the O. S. myopically astigmatic by 3 D.

Such data, while not accurate, is helpful in indicating the general astigmatic correction to be looked for, at least as to the amount. Retinoscopically, the usual "swirl" indicating conical cornea presented itself: correction skiametrically was attempted but scissors movements of extreme complexity occurred: these were in the main successfully coped with only

To find Angle between Horizontal and one Cross Cylinder



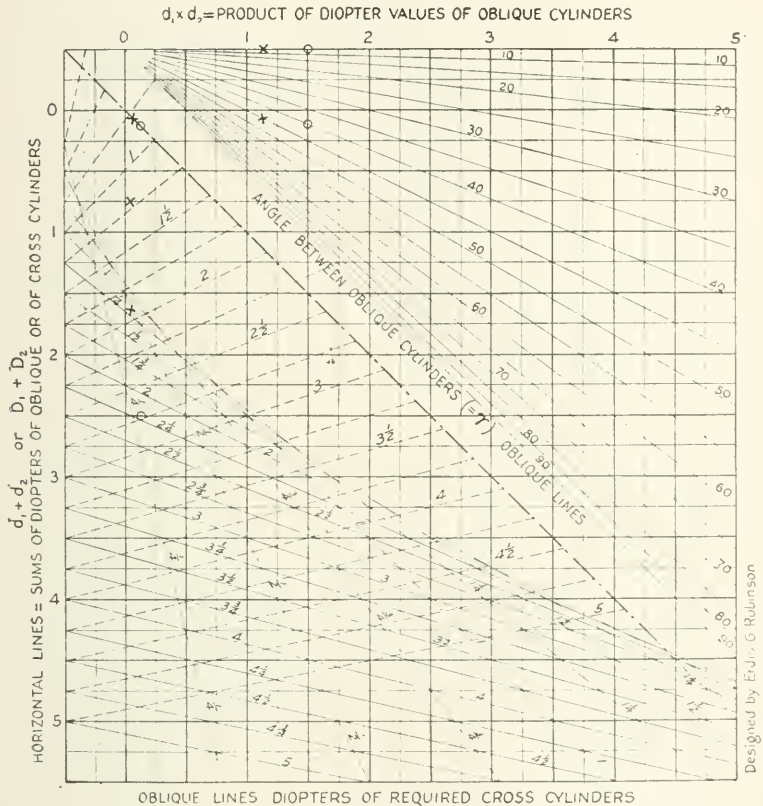
to give rise to other irregularities, making the task well nigh impossible. The case was therefore handled subjectively using a narrow stenopaic slit to determine the meridians of best and poorest vision employing for this test a chart letter which was just readable in the poorest vision slit position. The data, with calculations, is as follows:—

Right eye. Slit position 55° , vision sharpest.

Slit position 165° , vision poorest.

+2 D. S., slit at 55° , $V=8/10$; -4 D. S., slit at 165° , $V=8/10$. The prescription as a double cylinder at oblique axes is then +2 cyl. ax. $145^\circ \subset$ -4 cyl. ax. 75° . Making use of

To find Powers of Cross Cylinders, having given Powers of Oblique Cylinders, and their separating angle, $=\gamma$



EXAMPLE 1—Transpose into equivalent cross cylinders +150 cyl. axis $120^\circ \subset$ 100 cyl. axis 80°

Solution on charts indicated by small circles, O. We have $d_1=150$, $d_2=100$, $d_1 \times d_2=150$, $d_1+d_2=250$, $\gamma=40^\circ$. Enter CHART I at top for $d_1 d_2=150$ and move vertically downward to oblique line for 40° ; then to left to Dividing Line (—) and down to point horizontally to right of $d_1+d_2=250$. Read from nearest oblique lines the values of $D_1=0.30$ D., and $D_2=2.20$ D. Enter CHART II at top for $d_1=150$, and move downward to intersect oblique line for $D_1=0.30$ D., and from scale at right read $C_1=-0.75$. Likewise find $C_2=-0.95$, and $C_1+C_2=-1.70$. From values found by CHART I, $D_2-D_1=1.90$. Enter CHART II again and find δ , the required angle $=15^\circ$ on oblique line intersecting vertical through $D_2-D_1=1.90$ on top scale, and horizontal through $C_1+C_2=-1.70$ on scale at right. Hence required solution 0.30 cyl. axis $15^\circ \subset$ 2.20 cyl. axis 105° .

EXAMPLE 2—Solution indicated by small cross X. Transpose +0.75 cyl. axis $135^\circ \subset$ -150 cyl. axis 180° . $d_1=0.75$, $d_2=-150$, $d_1 d_2=-112$, $d_1+d_2=-147.5$, $\gamma=45^\circ$. CHART I gives $D_1=-1.20$, $D_2=0.45$. CHART II gives $C_1=0$, $C_2=1.50$, $C_1+C_2=1.50$, $\delta=13^\circ$. Solution: -120 cyl. axis $13^\circ \subset$ 0.45 cyl. axis 103° .

equations (1—5) presented a few paragraphs back, we shall substitute therein the following data:

$$\begin{aligned} d_1 &= +2 \\ d_2 &= -4 \end{aligned}$$

$$\begin{aligned} \theta_1 &= 145^\circ \\ \theta_2 &= 75^\circ \end{aligned}$$

$$\gamma = 60^\circ$$

We must determine A and B , the values of the cross cylinders at right angles, and δ , the angle of one of the cylinders. Using the tables of sines and cosines and squaring these respectively, we find that

$$\text{Equation (1)} \quad X = 2.00 \times 0.671 - 4.00 \times 0.0669 = +1.074$$

$$\text{Equation (2)} \quad Y = 2.00 \times 0.329 - 4.00 \times 0.933 = -3.074$$

$$\text{Equation (3)} \quad A + B = X + Y = -2.00$$

$$\begin{aligned} \text{Equation (4)} \quad A \cdot B &= d_1 d_2 \sin^2 \gamma \\ &= 2 \times -4 \times 0.75 \\ &= -6.00 \end{aligned}$$

$$\begin{aligned} \text{Therefore } (A + B)^2 &= 4.00 \\ -4 \cdot A \cdot B &= 24.00 \end{aligned}$$

Solving these last two equations, $A - B = 5.28$ or -5.28

$$A = 1.64 \text{ or } -3.64,$$

$$B = -3.64 \text{ or } 1.64$$

Since $A + B = -2.00$, then

Equation (5) reads $(B - A) \cos 2\delta = Y - X$, or substituting the values of $B = -3.64$ and $A = 1.64$, we have $-5.28 \cos 2\delta = -4.155$.

Hence $\delta = 19^\circ$ (practically).

Our prescription is then 1.64 cyl. ax. $19^\circ \ominus -3.64$ cyl. ax. 109° , following the rule previously stated as to which cylinder should occupy the angular position δ . As a spherocylindrical combination this gives as the correction -3.64 D. S. $\ominus + 5.28$ cyl. ax. 19° . Subjectively it was found that -3.50 D. S. $\ominus + 6.00$ cyl. ax. 175° gave a visual acuity of 8/10 with a little metamorphopsia. This could not apparently be improved upon.

Left Eye. Slit at 15° , vision best.

Slit at 135° , vision poorest.

-1.75 sphere, slit at 15° , and $+1.25$ sphere, slit at 135° , give nearly normal visual acuity in each meridian respectively. The prescription as an oblique-axis cylindrical combination is therefore -1.75 cyl. ax. $105^\circ \ominus + 1.25$ ax. 45° . In this case

$$\begin{aligned} d_1 &= -1.75 & \theta_1 &= 105^\circ \\ d_2 &= +1.25 & \theta_2 &= 45^\circ & \gamma &= 60^\circ \end{aligned}$$

Solving, as in the solutions given above, we have

$$X = 0.51; \quad Y = -1.01$$

$$A + B = X + Y = -0.50$$

$$A \cdot B = -1.64$$

$$A = 1.50 \text{ or } -1.00$$

$$B = -1.00 \text{ or } 1.50$$

Using the values $A = 1.50$ and $B = -1.00$, and substituting in the equation $(B - A) \cos 2\delta = Y - X$, we have

$$-2.50 \cos 2\delta = -1.52$$

$$\text{or } 27^\circ \text{ (approximately).}$$

This gives as a cross cylinder correction 1.50 cyl. ax. 27°
 $\ominus -1.00$ cyl. ax. 117° , or -1.00 D. S. $\ominus +2.50$ cyl. ax.
 27° . Subjectively, O. S. -1.50 D. S. $\ominus +3.00$ cyl. ax. 20°
gave $V = 8/10$.

We have then as the final prescriptions the following:

$$\text{O. D. } -3.50 \text{ D. S. } \ominus +6.00 \text{ cyl. ax. } 175^\circ \text{ V } 8/10$$

$$\text{O. S. } -1.50 \text{ D. S. } \ominus +3.00 \text{ cyl. ax. } 20^\circ \text{ V } 8/10,$$

raising the vision from V (O. U.) $= 3/10$ obtained with the correction worn at the time; binocularly, portions of the 20/20 line could be easily read. The symptoms complained of and recorded in the initial paragraphs describing this case were in large measure relieved.

It will be noted that the axes of the cylinders subjectively determined are not in particularly good agreement with those calculated. The source of error does not lie in the mathematical theorems but rather in the extreme difficulty (which cannot be obviated as far as I know) in such cases of determining the best and poorest visual meridians, since without doubt these are slightly variable in the sense that we are dealing with difficult irregular astigmatic conditions. The ophthalmoscopic examination, for example, of both eyes under the proper angle of observation showed everything double. In such cases as these, therefore, the writer does not recommend the complete solution of the above equations, but does recommend that the practitioner, after obtaining his data, solve for the values of A and B , the two cross cylinders, making use of equations (1—3), to then insert these two cylinders as a sphero-cylindrical equivalent and to finally rotate the cylinder until the best visual position is obtained and finish the test subjectively. To illustrate: take the calculations relative to the right eye given above. A turns out to be 1.64 and B to be -3.64 . This therefore is equivalent to writing 1.64 cyl. axis $(x) \ominus -3.64$ cyl. ax. $(x + 90^\circ)$, where " x " is not known but is to be determined. This cylindrical combination is equivalent to 1.64 D. S. $\ominus -5.28$ cyl. ax. $(x + 90^\circ)$, or as we have previously used it, -3.64 D. S. $\ominus +5.28$ cyl. ax. (x) . Insert then in

the trial frame a -3.50 D. S., together with a $+5.25$ cylinder and rotate the cylinder to the best position which is, in this case, at 175° , obtaining as a final solution $-3.50 \text{ } \ominus + 6.00 \text{ cyl. ax. } 175^\circ$ (using the value of the cylinder finally determined upon). It will also be found in such cases as this that the two equivalent sphero-cylindrical corrections are not equally satisfactory. In this particular case -3.50 D. S. $\ominus + 6.00 \text{ cyl. ax. } 175^\circ$ gave $V = 8/10$, while the equivalent form 2.50 D. S. $\ominus - 6.00 \text{ cyl. ax. } 85^\circ$ or any attempted modification of any of the quantities in this form of the prescription were absolutely rejected by the patient as much inferior to the first form of correction. I am confident from my experience with such cases that equivalent forms are not equally acceptable. The easiest and probably the correct answer as to why this is so lies in the statement that the rules of regular astigmatism and their correction cannot hold in irregular cases.

The method of procedure as outlined above is also of advantage in that it furnishes the operator with his final form of correction before the patient's eye and thus enables him to make the necessary minor changes to give the best visual acuity. Chief of these advantages is the determination of the proper position of the cylinder, for in such cases rotation of the cylinder of less than 5° from the proper position will produce marked changes in the visual acuity and also introduce considerable metamorphopsia. In fact it is oftentimes impossible to couple best visual acuity of letters with perpendicularity of letters in such ocular conditions.

It is generally of interest and a necessary procedure to determine muscular balances at infinity and at the reading point, although in such a case as the above it would be advisable to simply make these observations a matter of record and not incorporate in the first prescriptions. In the case in hand, the muscles showed at 20 feet a left hyperphoria of 1° and no lateral imbalances; at 13 inches, the same vertical imbalance and $3-4^\circ$ of exophoria.

Mr. Erdis G. Robinson, C. E., of Columbus, Ohio, has given graphical methods of determining the solutions of equations (1—5). These are inserted in this article as Figures 2 and 3, together with his explanatory notes and directions. Copies of these charts may be obtained gratis of Mr. Robinson.

The chief points of this paper are:—

(1) The use of the narrow stenopaic slit for the determination as accurately as possible of the best and poorest visual meridians and the attainment of the highest visual acuity in each meridian by the use of spheres according to the customary methods.

(2) The preliminary mathematical determination of the values of the two cross-cylinders, which should be converted into equivalent sphero-cylinders and substituted in the trial frame; determine subjectively the best position of the cylinder and finish the test.

(3) This method of procedure precludes the possibility of a prescription involving a sphere in combination with two oblique cylinders. The writer has seen several such prescriptions; they are the acme of crude form.

(4) The advantage to the practitioner of having the final form of sphero-cylindrical correction before his patient's eye and the nicety of adjustment of the cylinder thus permitted.

(5) The fact that equivalent sphero-cylindrical corrections are not equally acceptable warrants the use, in turn, of each form of correction in order to select that which is most satisfactory all points being considered.

(6) The use of a considerable amount of patience, skill and judgment in such cases will often reward the operator with gratifying results.

A CASE OF ANILINE OPHTHALMIA.

BY

WALTER N. SHARP, M. D.,

INDIANAPOLIS.

Without going into the literature of this subject I wish only to add one more interesting case to the many already on record.

Miss R., while riding with friends in a touring car in Indianapolis, in August, 1912, some foreign substance was forcibly thrown into the left eye. Strange as it may seem the foreign substance was broken pieces of an aniline pencil.

I was called to the house by Dr. J. H. E., about two hours after the accident. The eye was frightful to behold—so deeply colored by the aniline, and this increased by the addition of water in the attempt to wash it away.

On examination I found the conjunctiva was literally peppered with fine particles of aniline, and in places it seemed to

be imbedded. Dr. E. and I worked about an hour picking out numerous pieces with a delicate spatula. Beneath the folds of the plica semilunaris the more numerous pieces were found. These ranged in size from a pin point to a good size pin head and one piece was as large as the diameter of the lead of a pencil. There was no apparent break in the conjunctiva or cornea, though the former presented the appearance of a superficial burn. The patient was extremely nervous but experienced little pain. Cold applications were placed over the closed lids to prevent to some degree subsequent inflammation.

The following morning the patient was driven to my office. The eyeball was much less stained though there was much chemosis and swelling of the lids. The conjunctiva of the lower fornix was deeply pigmented and very minute particles of the pigment had the appearance of being imbedded beneath the outer layer. As they were so minute and could not be removed without much injury to the conjunctiva I allowed them to remain. The cornea was hazy and greasy in appearance. The pupil was normal in size but the fundus could not be seen because of the condition of the cornea. The vision was 20/60. I washed the eye with a five per cent solution of tannin.

During the first two days the condition remained practically the same. The conjunctiva of the lower fornix then began to show signs of necrosis and some sloughing took place. The pupil became smaller and some pain was experienced. The cold applications were discontinued and hot applications substituted. A one per cent solution of atropine alkaloid in sterile olive oil was dropped into the eye three times a day. Over the site where the stain was deepest the conjunctiva assumed a grayish appearance and sloughing continued. Adhesions formed readily between the conjunctiva of the lower lid and globe but the use of olive oil and the daily use of a probe in breaking up these adhesions prevented permanent symblephera.

Irido-cyclitis later arose but this was combatted with heat, atropine and dionin. The coloring soon cleared up but the conjunctiva was extremely red and edematous. The swelling of the upper lid continued where some of the aniline color was retained. During the second week the vision was reduced to 1/10. Because of the exudate in the anterior chamber and the extremely hazy cornea the fundus could not yet be seen.

At this time the inflammation had apparently reached its

height and at the beginning of the third week began to subside. The exudate and cornea fully cleared up and at the end of the sixth week vision was restored to normal and the fundus showed no pathological lesions.

The case is interesting because of the very peculiar manner in which this substance was thrown into the eye and the severe reaction following. I presume the latter was due to the chemical composition of the aniline pencil, as I understand that the basic colors cause violent inflammation of the eye which may result in panophthalmitis, while the acid, neutral or mordant aniline colors cause little or no reaction. Tannic acid in solution is supposed to produce an insoluble compound.

SOME EXPERIENCES WITH PASTEURIZATION METHOD IN TREATMENT OF CORNEAL ULCERS.

BY
WALTER J. GILBERT, M. D.

CALAIS, ME.

In the April number of the OPTHALMIC RECORD there appeared an article by Dr. A. E. Prince relative to his experience in the treatment of corneal ulceration by the pasteurization method. This article prompted a special interest to the writer inasmuch as a few weeks before he had treated a case along similar lines, not original with him, but following the suggestion of the patient.

On March 2nd Mr. T. came to the office referred by his physician. About one week previous he had been struck in the eye by a branch of a fir tree. At first the pain was severe but subsided until following day when he began to suffer with pain and photophobia. The usual home remedies were applied but conditions did not improve. One week from time of injury he consulted his physician. An examination revealed a central ulcer about 4 mm. in diameter, with hypopyon,—in fact the characteristic symptoms of a progressive corneal ulcer. The patient was placed in hospital and usual line of treatment instituted. While heating the Wadsworth-Todd cautery preparatory to cauterization, the patient stated that under no consideration would he allow his eye to be burned, but offered the following suggestion: "Doctor, why not hold the heated iron close to my eye instead of burning it. I have noticed that when the eye was held near a hot stove it relieved the pain and was a great deal more comfortable for a long time. If you should

do this would not the heat scorch the little devils you say have to be destroyed?" The writer stated to the nurse that perhaps the fellow was half right, as the bulbous end of the cautery must be 150° F. Not having sufficient faith in the suggestion, and perhaps being slightly vexed at the patient's seeming attempt to dictate line of treatment, trichloroacetic acid was applied to the surface outlined by fluorescein solution. During the night the patient suffered severe pain, and in the morning conditions had not improved. He again suggested trying the heated iron and was very insistent. The heated cautery was placed close to the ulcerated surface and held there until cool. Three applications were given and the nurse was directed to apply same at intervals of three hours. The following morning showed a marked improvement and the patient had a very comfortable night. The hypopyon was perceptibly lessened. The intervals of heat application were reduced to three times daily and at the end of fifth day hypopyon had disappeared. After seventh day the ulcer began to diminish and on the twelfth day the patient was referred to his physician.

From this time until the appearance of Dr. Prince's article no cases of progressive corneal ulcer came under the writer's observation, but since that time five cases have been treated with exceptionally good results.

Case 2. Was called in consultation with a colleague in reference to a progressive corneal ulcer which he had been treating for two weeks,—a teamster injured by a harness buckle. The ulcer was about 2 mm. in diameter to temporal side. Hitherto the treatment had consisted of hot applications, atropine, and yellow oxide ointment. The day before consultation the writer received Prince's pasteurizer and determined at this time to test the efficacy of this method. The eye was pasteurized three times daily and third morning examination revealed the anterior chamber entirely free from pus. The treatments were limited to twice daily with the result that on tenth day patient was discharged.

Case 3. Mr. M. while exercising a horse was struck in the eye with a small pebble. First examination showed an ulcer about 2 mm. in diameter, to the nasal side. The patient complained of severe pain beginning three days after injury. Complicated with the ulcer was a traumatic iritis with the characteristic symptoms. The iris responded to dilatation after repeated instillations of atropine and the application of leeches. Full

doses of sodium salicylate were given and on the fifth day the pain subsided. The ulcer, however, seemed to increase in size and a small amount of pus appeared in the anterior chamber. The pasteurization method was inaugurated with the result that in forty-eight hours the hypopyon had absorbed, the ulcer remained stationary and the patient stated he was absolutely free from pain. After ten days the ulcer had disappeared.

Up to the present time the writer has treated five cases of progressive corneal ulcer by the pasteurization method and is well satisfied that the Prince pasteurizer is a valuable agent in the treatment of these conditions. The conclusion may seem somewhat hasty based on the limited number of cases treated, yet the results have been so gratifying that the writer trusts he is not over enthusiastic. As Dr. Prince states in his article the value of this treatment is enhanced by the fact that it can be carried out by the general practitioner, the nurse in the private home or hospital as well as the oculist in his office.

HOW THE LAW REGARDS THE LOSS OF ONE EYE.

It is a much debated question whether the Court, in considering what is or is not suitable employment for a one-eyed workman in cases where the employer wishes to cease payment of the man's compensation money, ought to have regard to the specially serious consequences to him of the possible risk of an accident which may result in his becoming completely blind through an injury to his remaining eye. The judges have been far from unanimous in their opinion, their divergent views being well illustrated by the opinions respectively given in one of the cases by Lords Justice Buckley and Fletcher Moulton. The former said, "I do not myself accept that it would be a good reason to assign that having lost one eye the loss of the second would be of greater import to the man in question than to any other man. Of course it would be, but I do not think that is relevant upon the question of suitability." On the other hand the latter judge remarked, "In my opinion you cannot consider an employment suitable that a reasonable, careful man desirous of earning his living is entitled to reject because it exposes him to risks so serious in their consequences that he feels he is not doing his duty to himself and his family in encountering them." We regret to see that the more recent judicial opinions are inclining in the direction of Lord Justice Fletcher Moulton's view.—The Ophthalmoscope, September, 1916.

REPORTS OF SOCIETIES

CHICAGO OPHTHALMOLOGICAL SOCIETY.

DR. WILLIAM E. GAMBLE, PRESIDENT.

APRIL 17, 1916.

Results of Salvarsan Treatment in Ocular Conditions.

Dr. D. C. Orcutt: Is salvarsan of use in other than specific cases and if so what kind? Are there cases where its use is contraindicated?

Since September, 1915, it has not been possible to procure salvarsan and neosalvarsan, excepting a few doses of the American product.

The essayist reported cases from the records at the Illinois Charitable Eye and Ear Infirmary.

In five cases of optic atrophy treated by salvarsan and neosalvarsan the Wassermann was positive in 2; negative in 3. The duration in all the cases was under two years; the average time of treatment was six months. As to results, there was marked improvement in 2 cases; slight in 1 and no improvement in 2. The negative cases showed the most improvement.

In a case of nerve paralysis of eight months' duration with marked ptosis of right lid and diplopia with the Wassermann negative and vision 20/50 in right eye, left normal, with treatment continuing seven months, four injections of neosalvarsan and two of salvarsan, the patient was absolutely cured, with normal vision in each eye.

In two cases of sympathetic ophthalmia the results from the use of salvarsan were very flattering.

The essayist reported two cases of interstitial keratitis, one of which although a very bad case, cleared up completely in a much shorter period than has been expected under the usual treatment.

It is an accepted fact that while interstitial keratitis is to some degree a self-limited disease, yet with the aid of salvarsan its course is hastened at least one-half and the symptoms ameliorated; this statement is based upon the other cases reported and also the experiences of others.

The essayist combined cases of neuro-retinitis and vitreous opacities because he is satisfied that the latter never occurs as a distinct disease in itself, but is always associated with some other diseased condition.

The author also reported a case of a woman where the

trouble began last July, with no discoverable etiology; the Wassermann negative. Patient entered hospital January 31, with vision R. 20/100; left 20/80, vitreous very cloudy, fundus not visible. Patient given atropin and dionin t. i. d., neuro-retinitis diagnosed on February 14. On February 24, when vision was R. 20/80 and L. 20/70, six grams American Salvarsan given, with vision steadily improving until March 15, when six grams more of American Salvarsan was given, and by March 17, the vision was normal in each eye.

Summary: In five cases of optic atrophy three were improved, and no result in two.

In two cases of neuro-retinitis there was absolute improvement. In two cases of interstitial keratitis improvement occurred in each. In one case of paralysis of the third nerve there was absolute improvement. In two cases of sympathetic ophthalmia which would have been practically hopeless without salvarsan, improvement was secured in each.

DISCUSSION.

Dr. George F. Suker said that in interstitial keratitis it makes no difference whether antispecific treatment is employed or not, as the patients will improve under general treatment. Too much mercury is detrimental in interstitial keratitis. Interstitial keratitis is not in and of itself in every instance a direct expression of syphilis in the cornea but often the result of secondary syphilitic toxic influences. In secondary interstitial keratitis, that is one due to the syphilitic toxin and not the spirochete, salvarsan has been of value where the spirochete pallida occurs in the corneal tissue proper. When there is a local reaction in the circum-corneal injection following the initial dose of salvarsan, the spirochete pallidae are very frequently found in the corneal stroma. Therefore, salvarsan acts somewhat after the manner of tuberculin and in such cases a marked improvement follows its use. As to the effect of salvarsan in various optic atrophies, it all depends whether they are of the direct specific type or on a specific base only. With syphilitic optic atrophy the question often arises whether the manifestations are those of general paralysis or senile dementia. In general paralysis there is frequently an intermitting improvement for the time being in the condition, both general and in the optic atrophy. It is incumbent upon us to differentiate whether we are dealing with simple senile or parietic dementia or with a higher form of tabes or with a lower type or with a progressive

multiple sclerosis as distinguished from disseminated sclerosis. A negative Wassermann does not mean anything in these ocular conditions. In these indefinite syphilitic cases a spinal puncture and a careful examination of the fluid must be made to exclude syphilis as the direct cause, except where the use of luetin reaction is employed. The luetin test for the presence of tertiary syphilis is as dependable as any test we have at the present time. The consensus of opinion at the present time, in reference to the therapeutic value of salvarsan, is that it is no better than mercury and when used must be followed by mercury.

Before the commencement of his talk on "Consideration of the Chiasm," Dr. George F. Suker presented for inspection a specimen of an absolutely fresh brain, the various interesting features of the chiasm being pointed out.

A dried specimen was exhibited showing the chiasm with its meningeal coverings removed to the anterior-posterior bifurcation, showing the chiasm resting on the pituitary body, which is posterior to the chiasm proper, thus allowing considerable freedom for displacement. The internal carotids are in close juxtaposition to it and may influence the chiasm, as in cases of general arteriosclerosis they are apt to give rise to binasal hemianopsia. In order to produce binasal hemianopsia two lesions are necessary, one on either side in the angle of the chiasm. If the anterior cerebral artery should become sclerosed more on one side than on the other, there will be one-sided hemianopsia due to pressure on the same side as hemianopsia which, however, is rather unusual. Care should be taken to determine whether the condition is due to a local or constitutional lesion. The pituitary body is set relatively deep and covered over and above by dura mater and pia mater and arachnoid; the chiasm lies on top of these meningeal coverings almost anterior to the pituitary and is supported in the sphenoidal groove as it were like in a swinging basket. Thus considerable movement is afforded to the chiasm. The wisdom of Nature is thus shown in the location and freedom of movement of the chiasm. The infundibulum of the pituitary body and the recesses of the third ventricle are the principal portions which give rise to chiasmal involvement.

Dr. Suker then presented and explained seventeen different types of fields which can arise from the lesion being in the chiasm or its immediate vicinity.

1. Bilateral nasal hemianopsia.
2. Temporal hemianopsia with upper outer temporal hemianopsia in the other eye of the quadrant type.
3. Bitemporal quadrant hemianopsia.
4. Blindness in one eye with upper temporal quadrant hemianopsia in the other.
5. Central scotoma—unilateral or bilateral.
6. Right and left hemianopsia superior and inferior.
7. Unilateral temporal quadrant hemianopsia, right and left.
8. Unilateral nasal quadrant hemianopsia, right and left.
9. Complete bitemporal hemianopsia.
10. Bitemporal quadrant hemianopsia superior and inferior.
11. Central scotoma, accompanied by a homonymous hemianopic blind area on the temporal side of other eye.
12. Complete amaurosis in one eye with temporal hemianopsia in the other.
13. Central bitemporal hemianopsic scotomata.
14. Peripheral bitemporal hemianopsia with central temporal hemianopic scotoma.
15. Unilateral central temporal hemianopic scotoma.
16. Bitemporal color hemianopsia.
17. Bitemporal hemianopsia with central scotomata.

The Anatomy and Pathology of the Chiasm.

Dr. Francis Lane said that the chiasm may be regarded as the prolongation of the brain. The structure of the brain cannot be studied apart from its physiology and pathology. It is impossible to study the cerebral portion of the visual apparatus apart from the brain. This is, therefore, true of the chiasm. Neurology is not a part of any other science, but is a science by itself, and to which all other sciences pertain.

(The speaker then read a considerable portion of his address from manuscript, after which he proceeded further without manuscript.)

Dr. Lane said that in considering pathology it was not his purpose to account for the clinical symptoms which arise from certain tissue changes. It is almost impossible to understand pathological changes in the chiasm without considering the retina and its optic nerves, because many of the changes are ascending and are the result of changes in the bulb and in the orbit. Retro-bulbar neuritis does not present any ophthalmoscopic picture at the time, but will show secondary degenerative changes. Any inflammatory condition of the optic nerve in any portion of the fibers, medullary sheath and the neuroglia does not show signs of active inflammation. The changes in these structures are secondary. In the optic nerve we have

interstitial neuritis, which is impossible in the chiasm, because of the absence of connective tissue. Leucocytes and inflammatory products are thrown out in interstitial keratitis, and when organized will cause pressure on the axons.

In ascending atrophy the elements first involved are the ganglionic cells. The first evidence of atrophic change is the degeneration of the fat globules. The nucleus of the cell takes the stain less readily and degenerates into a vacuole surrounded by neuroglial tissue. Coagulation necrosis is the cause of opacities in the retina, in embolism of the central artery, in cases of family amaurotic idiocy, and in quinin amblyopia, because the process is supposed to begin in the ganglionic cell, and the ganglionic cells become less disturbed the further we get away from the optic nerve. We do not find opacities in the central region because of the absence of the ganglionic cells. In cases of opaque nerve fibers, if the degenerative condition takes place in the ganglionic cells the medullary fibers of the nerve will disappear and we find the red reflex where the opacity was present before. In tabes and paralytic dementia the initial lesion is thought to take place first in the ganglionic cells, but it is an ascending atrophy. Cases examined anatomically show that the ganglionic cells are degenerative.

During degenerative changes the nerve fibers after preliminary changes become hyalin and finally disappear. According to the Wallerian law that if the peripheral nerve is severed it does not degenerate centrally, it is different in the case of the optic nerve which is inter-central and not a peripheral nerve. If the optic nerve is divided descending as well as ascending degeneration occurs.

Pressure may be caused by new growths of various kinds, organized exudate, skull deformities, hemorrhages in the sheath, callus after fracture and tumors of various kinds.

In disseminated sclerosis the process is entirely different from that in tabes dorsalis. The one is an atrophic condition, while the other shows proliferation of connective tissue, as in disseminated sclerosis. So it is a secondary atrophy of the optic nerve which occurs in disseminated sclerosis.

Certain lantern slides were then shown.

DISCUSSION.

Dr. George F. Suker said he wished to ask Dr. Lane whether the cones in the retina have two distinct fibers running to the chiasm and decussating there, or whether each cone has

but one fiber, and this fiber decussating in the chiasm.

Dr. Lane, in closing the discussion, said that Collins and Uhthoff made the statement that the primary lesion is found in the ganglionic cells of the retina.

In answer to Dr. Suker's question he could find nothing on that point as to the decussation of the fibers which would come from the rods, whether it is from one or the other, from one or two (indicating on chart).

The cut and stained specimens alone are not sufficient to solve these problems. Anatomy cannot be studied apart from physiology and pathology. The cases must also be studied clinically.

Dr. F. D. Vreeland reported the case of a patient whose left eye was enucleated on account of injury, twenty-five years ago. Three weeks following the enucleation the right eye became involved and irido-cyclitis accompanied by occlusion of the pupil occurred. The eye was treated on that occasion and became quiet. It was decided to do nothing with the eye, and the patient thought he would not be able to see again, and so he went to Jacksonville and graduated at the Institution for the Blind there. The speaker saw the case last December. It was a case of small undeveloped eye, the anterior chamber obliterated and the cornea very small. The deposits on the cornea extended above the pupillary area. Perception and projection were intact, and it was thought vision might be gained by an iridotomy which was done. The patient could see before the operation a hand four inches from his eye. After the operation which was done by means of a thin cataract knife he could count fingers at fourteen inches. He was discharged and later had a return of the inflammation, and now can count fingers at ten inches. The pupil being occluded, he has double vision. The pulling out of the iris seemed to pull the iris a little beyond the exudate, so that this double vision is probably through the periphery between the exudate and the iris. What is there back of the iris? Nothing can be seen. The speaker said he would like to have suggestions as to what to do in a case of this kind. In these conditions the lens is usually small or rudimentary. The corneal section would not permit the removal of the lens if of normal size. The patient has been on salicylates and iodids and other preparations.

PAUL GUILFORD, Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

DR. WILLIAM E. GAMBLE, PRESIDENT.

MAY 22, 1916.

The Purpose and Plans of the Illinois Society for the Prevention of Blindness.

Miss Carolyn C. Van Blarcom stated the purpose of the society to be the prevention of unnecessary blindness and to conserve vision through the efforts of a lay organization. The eyes of new-born babies should be treated prophylactically, and affected eyes should be subjected to treatment. The society is a go-between between the medical profession and the lay public. Its plans are to digest medical teachings and place them before the general public, and to bring under medical supervision the largest possible number of afflicted babies. This is not so simple as might be thought. The Illinois Society has been in existence actively for three years. It has secured the enactment of the excellent law for the early reporting of such cases to the State Board of Health. In Illinois the gratuitous distribution of the prophylactic medicine is provided for, and adequate dispensary facilities are already in existence in the state. This makes an almost ideal machinery to cope with this problem. In a short time there have come under the observation of the speaker six blind or partially blind children in Chicago, which blindness would have been preventable. The Society is as yet doing foundation work only in Chicago. This blindness is solely due to the lack of proper care, and it is the purpose of the Society to supply this lack. The speaker cited various instances of cases of preventable blindness, one instance showing a reprehensible lack of attention on the part of a physician. The gist of the cause in all these instances was ignorance and neglect. The remedy is through the dissemination of information and bringing to the lay public a realization of the seriousness of the condition.

Secondary infections are as serious as the primary infections. It is important for the mothers to take the children to the eye clinics, leave them in the hospital, when necessary. This measure is sometimes enforced by the arm of the law. An instance of this was cited, as occurring in Chicago. If the need is realized, relatives will usually take the babies to the dispensaries, on their own initiative. Widespread publicity is of fundamental importance.

The Illinois law requires the reporting of cases of sore eyes in infants within six hours. This is for the benefit of the babies which are not under medical care. A frank endorsement and enforcement of this law by vigorous methods is essential.

The speaker related the experiences encountered by the organization in Massachusetts, and the great success they attained was accomplished by publicity and prosecutions.

The burden of this work rests upon the medical profession. It is the business of this Society for the Prevention of Blindness to place before the lay public the recommendations of the medical profession. The principal needs are publicity and compliance with the reporting law. A nurse is needed, however, for the investigation of local situations and conditions. It is desirable to know the particulars about all the babies treated in the eye clinics and to follow up such babies, especially those whose mothers have failed to return to the clinics when instructed. Also the Society should know about babies taken from the hospital against the advice of the doctors. Card statistics for information are desirable. The great need of lecturers before clubs, organizations, churches, settlements, schools, etc. In this co-operation is needed by the members of the Chicago Ophthalmological Society. Lantern slides can be supplied. The organization needs the united backing of the Ophthalmological Society in its work.

Discussion.

President Gamble said he had felt the need of organized work in this direction, and that it is the duty of the Chicago Ophthalmological Society to help. The President said that the Chair would entertain a motion for the appointment of a committee to draft resolutions endorsing the work of the Society for the Prevention of Blindness.

It was moved, seconded and carried that a committee be appointed to endorse the work of the Illinois State Society for the Prevention of Blindness; and the Chairman thereupon appointed as members of such committee Drs. Findlay, Suker and Tivnen, who retired and later brought in a report, which is embodied in the minutes.

Dr. George F. Suker said that dispensary cases have been neglected by the dispensary men. The dangers in these cases have not always been duly explained by the clinic men to the parent. There has been, in some cases, an absolute failure of

this duty. It is absolutely wrong to treat these gonorrheal patients as dispensary cases. They should be treated in the hospital. Most of the cases occur among people who are eligible to admission to the Cook County Hospital. The baby is the innocent victim in these cases. A goodly majority of the gonorrheal eye cases occur after the first child is born. The cause is due to the damnable rascality of the man.

The speaker said he would not hesitate to denounce any minister who would not permit lectures of this kind as suggested by Miss Van Blarcom to be given from his pulpit.

Dispensaries should be required to report these cases promptly for hospital treatment. All the hospitals should be forced to take such cases, even if they are not "financially profitable" to them—at least, their interns and nurses would get valuable experience and the hospitals owe this much to them and to the public at large.

Dr. Thomas Woodruff said that very few hospitals will take cases of babies with infected eyes, unless they have private rooms. The Society for the Prevention of Blindness has been endorsed by the Chicago Association of Commerce, and occasional hearings before the Ways and Means Committee of that organization have been promised.

It is the duty of the States Attorney to prosecute any physician, midwife or others present at birth of babies, who violate the law. This Society will bring to the attention of the proper authorities any failure to report babies' sore eyes and let them act.

The Society for the Prevention of Blindness desires an endorsement from all possible sources, and desires to organize branches throughout the cities of this state. Lecturers are badly needed, as stated.

Eye Relations to Ear, Nose and Throat.

Dr. Joseph C. Beck pointed out the intimate relations between the eye, ear, nose and throat and reported some unusual cases which were grouped under each of the following headings: 1. Labyrinth irritation from the eyes and vice versa. 2. Ethmosphenoiditis with orbital cellulitis simulating cavernous sinus thrombosis. 3. Infected ethmoidal cyst with periodical exophthalmos. 4. Recurrent unilateral iritis of eighteen years' duration. 5. Non-suppurative sinusitis causing practically blindness, diffuse edema of the retina, operation, followed by complete recovery of vision. 6. Tumor of hypo-

physis with unusual complications. Post-mortem findings, and description of a new operation. 7. Suppurative dacryocystitis cured by the canaliculo-nasal route.

DISCUSSION.

Dr. Harry S. Gradle stated the case of anterior ethmoidal cysts was of particular interest in that the ocular findings were negative. The vision was normal; the fields were normal, no central scotomata could be found and the blind spot was not enlarged. We are accustomed to look for disturbances in these functions, in purulent disease of the ethmoid, because of the extension of the disturbance towards the apex of the orbit. The optic nerve is here involved and the changes can be detected. In all likelihood, the extremely thickened periosteum that was found during operation prevented any spread of the ethmoidal trouble towards the region of the optic nerve.

The case of recurrent irido-cyclitis was of special interest in that no definite etiological factor could be found. To the speaker's mind there are two possibilities: the first and the least probable, is that of sinus disease of long standing, low-grade type. The second and more likely of the two is a chronic enterogenous intoxication.

The relationship between the eye and the ear is of extreme interest, and presents one phase which Dr. Beck has not brought out. This is manifest in the deafness which occurs during the course of a sympathetic ophthalmia. Such cases have been reported to the number of 23 and have been explained theoretically on the assumption of Elschnig's anaphylactic theory of sympathetic ophthalmia. According to Peters of Rostock, the basal membrane of the labyrinth contains a small amount of pigment identical with the pigment found in the uvea. Consequently any sensitization of the body by antigenic absorption of uveal pigment will also sensitize the labyrinth which may be involved in an anaphylactic outbreak. This would explain the deafness of the bilateral labyrinthine type that occasionally accompanies sympathetic ophthalmia. He had occasion to see such a case in consultation recently.

Dr. Beck, in closing the discussion, said that in this craze for ascribing infection to the teeth, tonsils, sinuses, appendix, etc., the strong probability of lues and gonorrhea as etiological factors has become somewhat overlooked. The teeth are now receiving very much attention from all possible sources. This

particular patient shown by the speaker is malnourished, and needs to have good food hereafter.

The subject of the pigment in the labyrinth is yet to be demonstrated histologically.

Bony Tumor of the Vitreous Chamber Springing from the Ciliary Body.

Dr. Heman H. Brown reported the following case:

J. Fuller, aged 18 years and 4 months; only child; family history so far as could be determined is good. No evidence of eye disease in either parents or parents' families. No trace of tubercular trouble with patient or families. Aside from the eye difficulty, the patient seems perfectly normal in every way. Except measles, there has been no physical illness during her entire life. Her birth was normal (no instrumental delivery), and at birth the child in every way seemed physically normal. At four months of age the right eye became very red and inflamed, causing great suffering. The attack of inflammation lasted for two months, during which time she was under the care and treatment of a competent ophthalmologist, who pronounced the case glioma of the retina, and advised the removal of the eye. The inflammation, however, slowly subsided and the eye assumed a state of quiet, but the pupil remained widely dilated and fixed, with a distinct yellow reflex. This dilatation remained a permanent feature of the eye. (The mother thinks the eye was blind after the first attack, but previous to that time had noticed nothing to attract attention to the eye.)

Three months later the patient suffered a second attack of inflammation similar in its manifestations to the first though shorter in duration. Glioma was again diagnosed and enucleation advised. The diagnosis was concurred in by a consultant at this time.

Following this seizure the eye assumed a slightly staring appearance. No further difficulty was experienced until at five years of age, when she suffered another attack of inflammation. This was the most severe of all, and the ophthalmologist in attendance again advised enucleation to avoid, as he stated, rupture of the eye-ball. There is no evidence at hand of irritation or disturbance of the left eye at any time. Aside from an occasional redness of the right eye, with little suffering, lasting but for a few days at a time, no further disturbance was experienced

until three weeks previous to the time she consulted me, on August 15, 1915. At that time the following conditions were present:

Left eye: Vision, 20/20; normal in every way. Right eye: light perception only, and in a state of general inflammation. This condition, she stated, had existed for three weeks. The cornea was slightly steamy in appearance, with bulging at the nasal side and noticeably thinner. Springing immediately from the limbus, there existed a wedge-shaped abrasion of the cornea, at its base four millimeters in width. This extended directly across the center of the cornea to the limbus on the temple side. Above and below the apex of this abraded area an imperfect view of the eye chambers could be had. The pericorneal injection was deep, indicating a marked ciliary inflammation. The sclera likewise deeply injected. The anterior chamber deepened and iris out of sight. Aqueous and lens slightly turbid. Although the media could be imperfectly viewed, yet the yellow reflex from the posterior chamber could be seen quite distinctly. The motion of the eye ball was entirely unimpaired, but the upper lid edematous and drooping. The suffering to the patient was excruciating. The history of the case and its present physical findings suggested but one course to follow, namely, enucleation, which he did under a general anesthetic on September 9, 1915. When under the anesthetic a hard tumor could be distinctly felt within the eye chamber, apparently smooth in its outline. The eye, after enucleation, presented nothing of particular interest. There were no adhesions to the orbital contents or marks of cicatricial contraction in the sclera, as might be expected after a traumatism.

The pathologist designated the tumor as a form of coloboma with a fetal inclusion of bony tissue.

In conclusion, Dr. Brown called attention to three points of interest: 1. The quite evident fetal origin of the tumor. 2. The confusion which may arise from diagnosis of tumors of the new-born eye. 3. The entire bone formation would seem to have confined itself to the ciliary body.

DISCUSSION.

Dr. Adolph Gehrmann said that in this specimen we have bone which is perfectly quiet. There is no evidence of any new growth or retrogression of the bone. There is bone

in the ciliary portion and also farther back. Active growth or degenerative change through the osteoclasts at the time of the enucleation is out of the question. The tumor is absolutely benign. As to bone formation after injuries, there is one statement in the literature that the bone extends to the lens. The occurrence of bone after injuries occurs about as bone develops after injuries elsewhere when there are persistent inflammatory or circulatory changes.

There are three theories as to how and when this growth occurs as a metaplasia. First: Cohnheim's theory of fetal inclusion of embryonic cells. Second, bone formation on account of changes in the blood vessels walls, the protoplasm laying down bone itself. Third, the bone theory of Ribbet that bone cells get free and float through the circulation and lodge at various points and form new bone structures.

In this case evidently the formation occurred early because of the quiescent and the comparative youth of the patient. Whether there was any fetal inclusion originally is a matter of surmise. There is a possibility that bone is formed in the fetus and that in the body later in life may be caused through the same circulatory disturbance which is in the nature of calcification of cells around the blood vessels. Thus we obtain the structure of the bone and the peculiar relation to the blood vessels and their walls. Bone may be found in any very vascular location and also where vascularity has been brought about by irritation and congestion as in keloids or in muscles where pressure has irritated for a long time. Sometimes, as in a case shown by Dr. Day, bone was found in the lungs. In Dr. Brown's case there may have been some choroidal disturbance in early life with the formation of a shell of bone in the choroid and in the adjoining ciliary body. It is certainly perfectly well-formed, quiet bone structure that has not changed for many years.

Dr. Brown, in closing the discussion, said that there is no lack of literature upon bony shell formation in the vitreous chamber, having their origin in the capillary system of the choroid. They are very common. But an individual confinement as this is to the ciliary process is unique, and especially so in that there is no possible evidence of injury which seems to precede bony formation such as we find the literature teeming with. There is no pan-ophthalmitis, no external irritation or infection: a bone formation arising from the ciliary process.

without a previous history of injury, is rather unique.

Dr. George F. Suker reported two cases, one of fat implantation into the eviscerated scleral cavity and the other a case of implantation of fat into the capsule of Tenon after an enucleation. The speaker expressed the belief that ocular operations should be for two purposes, one primarily for the surgical and functional effect, and the other, for the cosmetic effect. The speaker has found but few conditions which demanded enucleation in which he could not do an implantation of some sort or another. Recession of the upper lid is avoided and a much greater range of motion is obtained by implantation. The simple enucleation is not the ideal surgical procedure according to the accepted meaning of that term. The implantation method takes longer and the strictest surgical technic must be observed. The reaction following is much greater than in a simple enucleation. The transplantation of fat of the self-same patient is the best; the absorption of the fat is very little, especially when put into the scleral cup. The fat is usually taken from the side of the abdomen on the same side of the body as the enucleated eye. The piece of transplanted fat is generally about again as large as the ball itself when put into Tenon's capsule and when put into the scleral cup a little larger than the eye itself,—avoid undue pressure and manipulation of the fat.

DISCUSSION.

Dr. Harry S. Gradle said he had reported 360 cases in the Archives of Ophthalmology of enucleation and evisceration with and without fat implantation, and that he was very glad to see these cases of Dr. Suker's because they bear out the reports which he had made at that time. In that report the speaker had said that fat implantation can be used in every case of enucleation of the eye-ball, and, in cases of evisceration, fat implantation can be used in every case except in the presence of infection of coats of the eye. In some 8 cases of protrusion of fat, out of 120 odd implantations, practically all were due to the implantation of fat in the face of an acute infection. Apart from these acute infections, there are no contraindications to the implantation of fat into either the sclera or the capsule of Tenon. The cosmetic effect is wonderfully improved in either condition. There is one decided advantage if fat is to be implanted following evisceration. If there should be protrusion of fat or if not enough fat were put in, at any time

within three or four weeks after the operation this defect can be remedied by the injection of paraffin. There is some absorption of fat after implantation of fat into the capsule of Tenon, but it is small. This fat forms itself into funnel-shape with the apex lying at the apex of the orbit. The implantation of fat into the scleral capsule is not followed by any absorption of fat to speak of. Two precautions, however, must be taken: too much fat cannot be implanted into the scleral capsule on account of pressure and the extrusion of the fat. On the other hand, in the implantation of fat in Tenon's capsule a larger amount must be implanted. If the suturing is done carefully the effect of pressure is negligible.

Dr. Suker, closing the discussion, said that one cannot reason from dog to man, because the Tenon's capsule of a dog is not nearly as resistant as that in man. The absorption that takes place in man is relatively little; and enucleation properly done does not disturb the posterior portion of the capsule of Tenon. The longest implantation of fat he has had in the capsule of Tenon is a little over two years, and the amount of fat there has remained practically the same as when first transplanted.

Report of Cases.

Dr. William A. Fisher, in presenting a case, said that many competent operators believe that the old operation is safer than the intracapsular operation as practiced by Colonel Smith in India: the intracapsular operation being condemned on account of the loss of vitreous. With the slight modifications made by the speaker in the Smith technic, the danger of the loss of vitreous is less in the intracapsular operation than in the old method.

The speaker exhibited a male patient, aged 63, with immature cataract in both eyes: vision, right 4/200; left 10/200. The intracapsular operation was performed on the right eye April 8. Both eyes bandaged nine days. No pain or inconvenience; not confined to bed. Bandage removed at end of nine days. Patient could count fingers at five feet. Smoked glasses prescribed with no other treatment. Thirteen days after operation there was scarcely any redness; left eye was operated upon in same manner as the right. Bandages omitted after nine days and smoked glasses ordered. No pain or inconvenience from second operation. Patient dismissed from

hospital May 16. On leaving hospital his vision in the right eye was 20/15 with plus 10, and 20/20 in the left with plus 10. The speaker said he used the same amount and kind of pressure with the modified technic as is made in India; that the needle is only used when the lens refuses to be born after safe pressure. The needle is no part of the Smith technic. The incision is always made in the cornea; there has been no loss of vitreous in the last 20 operations; there have been 3 cases of post-operative inflammation in the last 94 operations; the better the intracapsular technic is understood the less often will the needle be necessary.

The speaker has obtained 20/20 in more than half of 94 consecutive cases recently reported.

There are many who would oppose these procedures described, but the speaker is of the opinion after operating 200 eyes in this manner that there is more to be said in favor than against operating upon both eyes at the same time.

DISCUSSION.

Dr. George F. Suker said that there is no question about the intracapsular operation being the ideal one. There is only one objection, an anterior vitreous haze occasionally occurs, which is principally in the hyaloid membrane. When this membrane is injured or wrinkled it remains so, and accounts for the apparent capsular remains in some of these intracapsular extractions. This does not occur very frequently, however. If the corrugation and wrinkling of the hyaloid membrane is very intense, it is advisable to needle very cautiously. What causes this wrinkling he does not know.

Dr. Fisher, in closing the discussion, said that he had not had the experience of this wrinkling, and that it might be due to faulty technic; that he could always see the fundus without trouble upon getting the lens out.

PAUL GUILFORD, Secretary.

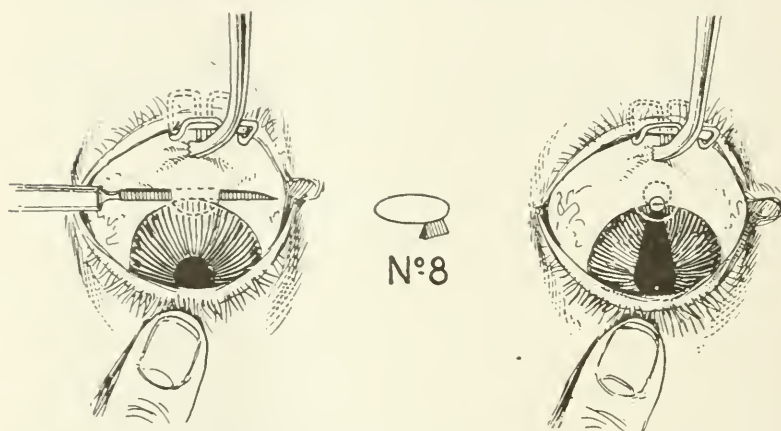
CORRESPONDENCE

Editor OPHTHALMIC RECORD:

Kindly permit me to add a word to be read in connection with my article on Glaucoma Simplex, which appeared in the October issue.

While taking part in the Eye, Ear, Nose and Throat Clinic of The Southwestern Medical Association, which met at Ft. Smith, Ark., on October 2d. I had occasion to demonstrate my

method of introducing the mule-shoe drain for reduction of the tension. After making preparation in the usual manner I fortunately, although unintentionally, buttonholed the flap. Having done this I folded the flap back and introduced the drain from the corneal side. I left the stitches loose to prevent dragging the flap upward and exposing the drain. Dr. Moulton writes me that the case did remarkably well. After two weeks the drain was in perfect position and the tension was normal. He is afraid, however, that it will be necessary to remove the drain on account of the slight exposure of the drain. Now I can see no reason why we may not simplify the operation by eliminating the incision in the conjunctiva above the cornea



Showing Method of Making Corneal Flap and Mule-Shoe Drain in Position.

and all the disturbance of the subconjunctival tissues and capsule of Tenon, by substituting a small, very thin, corneal flap.

I have worked out the following technic as a substitute for all conjunctival flaps, and have tried it once and found it a success.

Introduce a narrow Graefe blade under the conjunctiva and capsule, the edge of which is tangent two and one-half millimeters above the limbus.

Cut a thin corneal flap about five millimeters wide and three millimeters high, with the limbus for a base.

Lift the corneal flap, trephine, iridectomize, insert the toe of the drain and replace the flap.

No incision, excepting the width of the blade, will be made

in the conjunctiva, no stitches will be required and no violation will be done to the delicate subconjunctival capsular tissues, to interfere with drainage into the subcapsular space.

I am also suggesting an improvement in the shape of the toe to make it have the effect of a keystone both ways, which may possibly increase its efficiency when introduced through a vertical linear incision at the limbus, thus eliminating the use of the trephine as shown in cut.

Very respectfully yours,

A. E. PRINCE.

HEMERALOPIA

The frequency of hemeralopia, extremely low in time of peace (1 in 12,000 in France, according to Walter), undergoes an augmentation in wartime. At Verdun, Dr. Bourdier found 8.78 per cent. in ocular examinations during the winter of 1914-1915. At the same period, there occurred in the German army a grave epidemic of this condition. More recently, Vejers has observed it in proportion of 10.2 per cent. This high figure depends on many causes, some peculiar to the present war, which presents conditions different from those which have prevailed, in the past, such, for example, as the higher mean age of the combatants. The hemeralopia in the present war differs from those which have been described in previous wars in two respects: In the first place, there has been no epidemic, and the revictualing of the army being satisfactory, there have been no crises of hemeralopia due to privation and physiologic misery. By reason of selection, symptomatic hemeralopia is rarely found more in military than in civil life. In most cases it seems related to some vice of refraction and principally to myopia. The condition has been observed among volunteers in the early months of the war, among officers of the regular army and medical officers, and because of these facts and others contained in the reports of the commanding officers and because of the isolated character of each case, it is evident that, in the present war, hemeralopia is a symptom rarely invoked by malingerers. Except for those cases traceable to general diseases (of liver and kidneys) or to ocular fatigue or disease, there seems to be no satisfactory treatment for the condition. (Jour. A. M. A. Sept. 9, 1916.)

Wilbur Boileau Marple, one of the most widely known ophthalmologists in America, died August 30, 1916, at his summer home in Kennebunkport, Me., at the age of 60. Dr. Marple attended Ohio State University for two years and was a graduate of Amherst in 1877 and of Starling Medical College, Columbus, O., in 1881. After his graduation he entered general practice with Dr. Foster at Washington Court House, O., remaining two years. He then took up ophthalmology with Herman Knapp in New York. Later he was on the medical staff at Ward's Island, at the State Immigrant Hospital, from 1884 to 1890, when he became chief of the hospital, retaining that position until it closed. He was a Fellow of the American College of Surgeons and the American Medical Association and a member of the American Academy of Ophthalmology and Oto-Laryngology, American Ophthalmological Society, American Therapeutical Society, New York Academy of Medicine and New York Ophthalmological Society.

He was ophthalmic surgeon to the New York Eye and Ear Infirmary and consulting ophthalmic surgeon to the Babies' Hospital and the Central and Neurological Hospital.



Wilbur Boileau Marple.
1856-1916.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Peter Hunter Thompson has been appointed clinical assistant in ophthalmology at Harvard.

Dr. S. Lewis Ziegler, Philadelphia, has been elected a member of the board of trustees of Bucknell University.

Dr. James J. Mills of Baltimore has returned after several months of service under the French government at Biarritz.

Dr. Dwight C. Orcutt has succeeded Dr. Oscar Dodd as surgeon to the Illinois Charitable Eye and Ear Infirmary in Chicago.

Maj. Percy G. Goldsmith of Toronto has been transferred from the Canadian Eye and Ear Hospital at Folkestone to the Military Hospital at Bramshott, England.

Mr. R. S. Charlesley has been appointed assistant surgeon to the Royal Westminster Ophthalmic Hospital, London, Eng.

Dr. J. Chaillous has been made *mèdecin chef du service* at Quinze-Vingts, France.

A layman's meeting was recently held in Chicago in the interest of schools for teaching trades to the blind soldiers of Britain, France and Belgium.

A farmer in Pleasant Valley, Ills., is said to have sewn together the eyelids of his hogs to prevent their seeing and devouring his young chickens. This practice seems not to interfere with the proper fattening process. The S. P. C. A. brought him before a magistrate, where he was fined.

Dr. Norman W. Price of Niagara Falls, N. Y., has recently returned from a trip to Alberta, Canada, and the Pacific Coast and Yellowstone Park.

Dr. Burton Chance has been appointed Attending Ophthalmic Surgeon to Wills Eye Hospital, Philadelphia.

Col. R. H. Elliot has been appointed Hunterian professor of the Royal College of Surgeons of England. He will deliver two lectures on February 19 and 21, 1917, on the subject: "The Indian operation of couching for cataract."

The following deaths of ophthalmologists are announced:

Dr. Ernest E. Hamilton of Wichita, Kansas.

Dr. Frank D. Bates of Hamilton, Ontario.

Dr. Delbert C. Adeock of Somerville, Mass.

It is reported from Paris that a French girl has offered one of her eyes for the purpose of transplanting the cornea to the eye of a blind soldier. Prof. Duvignaud, to whom the offer was made, was sceptical of the efficacy of the operation, and did not accept the offer.

An example of the pseudo-science to which the layman is treated is found in the pages of a popular magazine in which an M. D. writes of the marvelous results of wearing glasses if one is afflicted with any one of a great variety of disorders including insomnia, heart irregularities, despondency, stammering, hysteria, epilepsy, rheumatism, pelvic pains, and insanity. Exophthalmic goiter seems to be amenable to this treatment and also diabetes, sugar disappearing from the urine, at least in the climate of Michigan, and blood pressure taking a truly alarming tumble. The secret of success is the "repression method," which appears to be none other than the ancient and exceedingly untrustworthy method of fogging used by the optician.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Parillo (P.-G.) G. W. Mahoney (Pol.) R. B. Stephenson (P.-G.) Carl Wagner (E.E.N.T.)	*Geo. F. Suter (P.-G.) C. H. Francis (Pol.) A. Duncan (P.-G.) A. G. Wippen (E.E.N.T.)	W. F. Coleman (P.-G.) S. M. Hager (Pol.) H. N. Lyon (P.-G.) Carl Wagner (E.E.N.T.)	G. W. Mahoney (Pol.) Richard S. Parillo (P.-G.) R. B. Stephenson (P.-G.) A. G. Wippen (E.E.N.T.)	C. H. Francis (Pol.) R. B. Stephenson (P.-G.) J. A. Cavanaugh (E. E. N. T.)	S. M. Hager (Pol.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.) A. G. Wippen (E.E.N.T.)
10 A.M.	Brown Posey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Ferry day, 10-12 A.M. Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)	Harry Gradle (E.E.N.T.)	J. R. Hoffman (E.E.N.T.)
1 P.M.	M. H. Levensohn (Inf.) Wm. O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenherr (Inf.) D. W. Eiss (Inf.) E. R. Crossley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County and Geo. F. Suter (County Daily, 2-30 P. M. W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) *Oscar Dodd (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Levensohn (Inf.) Wm. O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenherr (Inf.) D. W. Eiss (Inf.) E. R. Crossley (Inf.) C. C. Clement (Inf.) Oliver Tydings (E. E. N. T.)	W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) W. A. Fisher (E.E.N.T.)	M. H. Levensohn (Inf.) Wm. O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenherr (Inf.) D. W. Eiss (Inf.) E. R. Crossley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.) W. A. Fisher (E.E.N.T.)	W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) S. L. McCreight (C.C.S.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.) Oliver Tydings (E. E. N. T.)
3 P.M.	*Wm. F. Gamble (U. of I.) Wm. H. Wilder (Kush) H. S. Gradle Daily 3-5 (E. M. D.)	R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Kush) R. J. Tivnen (M.H.)	W. Allen Barr (C.C.S.)	*Geo. F. Suter (P.-G.) 2-5 H. Cuthbertson
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suter (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

ABBREVIATIONS:

*Special operative eye clinic.

C. C. S.: Chicago Clinical School,
1844 W. Harrison Street.
E. M. D.: Emanuel Mandel Dis-
pensary, 1012 Maxwell St.

County: Cook County Hospital, W.
Harrison and Monroe Streets.
Inf.: Illinois Charitable Eye and Ear
Infirmary, Peoria and Adams Streets.
M. H.: Mercy Hospital.

Pol.: Chicago Policlinic and Hospi-
tal, 221 W. Chicago Avenue.
P.-G.: Post-Graduate Medical School
of Chicago, 2400 Dearborn Street.
N. W. U.: Northwestern University,
2431 Dearborn Street.

Kush: Rush Medical College, W.
Harrison and Wood Streets.
St. Luke's: St. Luke's Hospital, 1416
Indiana Avenue.
U. of I.: College of Medicine, Uni-
versity of Illinois, Congress and Lin-
coln Streets.

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CONGENITAL GLAUCOMA AND SOME ALLIED CONDITIONS.

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and of the Detroit Ophthalmological Club.

(Continued.)

The resulting condition resembled human buphthalmos: the globe enlarged, the cornea flattened, ruptures of Descemet's membrane took place, and the optic disc was cupped. Meiotics diminished the tension of these eyes, whilst mydriatics increased it. Fluorescein introduced into the blood circulation appeared sooner and more abundantly in the aqueous, than it did in healthy eyes. The albumen content of the fluid in the anterior chamber was raised.

Schreiber and Wengler³⁷ repeated Erdmann's experiments, and confirmed his findings so far as the rise in intra-ocular pressure was concerned. Their most interesting discovery was, that if this increase in pressure was a gradual one, the optic nerve and retina remained practically unaffected, whilst if the tension was caused to rise suddenly, and was then maintained at a high level, marked degeneration of these structures took place. The condition which they thus produced in rabbits had a distinct resemblance to human buphthalmos; there was a manifest enlargement of all the diameters of the eye with preservation of the anterior chamber.

Terrien and Dantrelle³⁸ claim to have produced experimental buphthalmos by repeated punctures of the anterior chamber made at short intervals.

It is therefore of interest to recall, that Kummell³⁹ has observed, that burns of the limbus are associated with a rise in intra-ocular pressure, accompanied by an increase in the depth of the anterior chamber.

In connection with the above experiments, it is worthy of

note that Pichler⁴⁰ treated an albino rabbit for enlargement of the globe with hazy cornea and deep anterior chamber. The condition improved somewhat and eventually came to a standstill with excavation of the disc.

MEGALOCORNEA AND BUPHTHALMOS.

Is there a condition, which can be sharply distinguished from the pathological distension of the juvenile globe, which occurs as a result of an increase in the intra-ocular pressure? Kayser⁴¹ is strongly of opinion that there is; that it should be looked upon as a simple gigantism of the cornea; and that for purposes of distinction the name "megalogcornea" should be applied to it. Such a view is in opposition to the trend of modern opinion, which regards these cases as instances of infantile glaucoma, which have been fortunate enough to undergo arrest, before permanent damage has been inflicted on the eye. It has been urged in support of this view, that ruptures of the membrane of Descemet have been found in undoubted cases of megalocornea. The assumption that they *are* undoubted cases obviously begs the main question. Kayser's records include seventeen cases occurring in four generations of a family; in all of them, there was perfect transparency of the cornea, increased depth of the anterior chamber, enlargement of the iris, good vision, normal tension and a natural condition of the optic discs. With rare exceptions, the second generation was missed; males alone were affected, and transmission was through the female line. Kayser gives the following reasons for rejecting the view that these might have been cases of cured buphthalmos: (1) The individual cases differed so little between themselves, as to negative the idea of an arrested disease process. (2) He thought it inconceivable that the process should have developed so far before birth, and then remained stationary in every single case afterwards. (3) No females were affected, whilst in buphthalmos 40% of the cases are of that sex. (4) Buphthalmos is uni-lateral in 30% of the cases, whilst these were invariably bi-lateral, and (5) ruptures of Descemet's membrane were conspicuous by their complete absence, clearly indicating that no stretching of the eye had taken place after development was complete. Kayser's views had the unqualified support of George Coats⁴², who pointed out that buphthalmos had up till then been regarded as a familial, rather than as a directly heritable disease. Inasmuch, however, as in the vast

majority of cases it leads to blindness, the absence of records of direct descent is not astonishing. It is of importance that in not one single one of Kayser's cases was there evidence of any other congenital abnormality in the eyes. The family had lived four centuries in the same neighbourhood, and consanguinity was therefore a possible factor.

On the other hand, it is to be remembered that there are still a number of pathologists, and amongst them men of the reputations of Axenfeld, Elschnig and Fage⁵, who maintain that a closer examination of cases of so-called megalocornea will reveal changes pathognomonic of infantile glaucoma. Haab has long held a view widely divergent from this, and one more in accordance with Kayser's contention, viz., that these cases of megalocornea are to be looked on as a mixture of hyperplasia and gigantism. Horner shared this opinion and pointed out that the condition occurs in members of the same family, never alternating with buphthalmos; this observation was made from his own personal experience. Owuchi⁴³ found a grandfather, a grandmother, a father and two sons all suffering from megalocornea. J. Staehli⁴⁴ considers that there are numerous transitions from the normal sized cornea to megalocornea, none of which present any sign or symptom of glaucoma; he cannot see why eyes should be considered glaucomatous, when they have nothing in common with the buphthalmic eye, beyond the large size of the cornea, whilst in all other respects they are normal; the vision, the visual fields, and the condition of the media are all normal: the tension is not raised, and may even be subnormal, and that too after the exhibition of "trial mydriasis." On the other hand he does not admit, or even suppose, that these cases are not pathologic. Spontaneous dislocation of the lens may, he says, occur in them: an abnormally early areus senilis may declare itself; and marked alterations in the distribution of the uveal pigment may take place. All these things indicate, according to Staehli, that these cases have a pathologic character.

Before the 1913 meeting of the Ophthalmological Society of the United Kingdom, Treacher Collins⁷⁵ showed a lad of 17, whose corrected vision was 6/6 in each eye; the fields taken with 10 mm. white squares were normal, and the ophthalmoscopic examination showed no cupping of the disc. In discussing the case, Richardson Cross said, that he had recently seen a similar

case in a girl of 15, who had full vision after correction of her refractive errors. There was no cupping of the discs, the tension was as nearly as possible normal, and the earlier descriptions of the case indicated that the condition had been stationary for many years. The interest of this communication lies in the fact that it and the discussion, which followed it preceded Kayser's work and Coats' review thereof. The suggestion that arises is, that possibly in the light of later knowledge, these two cases might have been recognized as pure megalocornea. A factor somewhat disturbing to this view, was introduced by C. Killick, who in speaking at the same meeting, quoted a case of his own, in which there was complete excavation of the right optic disc, with bare perception of light in that eye, whilst in the left eye, which was also buphthalmic, there was a normal disc, and normal vision. He concluded, that it was a case of double congenital glaucoma, progressive in one eye, and stationary in the other.

It is evident that our views on this subject have not attained to finality, and it is important that in recording future cases, Kayser's observations should be very carefully borne in mind, and especially his contention that ruptures of Descemet's membrane are absent in megalocornea. The importance of this last observation will be obvious in the light of Coats' evidence, that he found these ruptures in all the cases (13 in number) of buphthalmos, which he sectioned, except in one, in which the cornea was too much folded to allow of a satisfactory examination. In none of the 1913 cases, does the report indicate, whether ruptures in Descemet's membrane were present or absent.

The view would appear to be gaining ground, that a condition exists, which is often confused with buphthalmos, but which differs from it essentially, inasmuch as it is a product of overgrowth and not of over-stretching. If this view is established, the name "megalocornea" will be justified. But, there is still a good deal of spadework to be done before we can rest from our labours, with the confidence that all difficulties have been cleared up.

JUVENILE GLAUCOMA.

Quite recent opinions, expressed by able and competent ophthalmologists, on the subject of Juvenile Glaucoma, exhibit so wide a divergence, as to suggest that the subject is far from having been mastered even now. On one point, however, there

appears to be an agreement, viz., that the group comprehends a great variety of different forms, some few of which should more correctly be classed under buphthalmos, whilst the rest include cases, which imitate and closely resemble every variety of form of senile glaucoma. The views of those, who write on the subject of the juvenile form of the disease, are largely influenced by the nature of the material which they have personally encountered. The condition is not a common one, and the accident of chance may determine that one observer sees a relatively large number of one class of cases, ex. gr., the late buphthalmic, whilst another's experience lies all in the "precocious senile" forms.

It is generally admitted that juvenile glaucoma is much **commoner in the male** than in the female, thus establishing a bond between it and buphthalmos, and at the same time forming a contrast with what is known to hold in senile glaucoma, in which the sexes are fairly equally attacked. Loehlein⁴⁵ found this feature strongly marked in his statistics, which covered a large range of cases collected from literature. Haag⁴⁶, however, whose cases were all drawn from one clinic (Tubingen), challenged this view, and stated that the preference of the disease for one sex was not well marked in his material. Both surgeons appeared to be dealing with large enough numbers to make their conclusions fairly reliable, and one is therefore somewhat at a loss to explain the discrepancy.

The frequent presence of some form of **congenital anomaly** in cases which fall under the juvenile group, is striking and very significant. Loehlein calculates that 50% of all of them reveal one or another of these signs of hereditary taint. His list includes persistent hyaloid arteries, persistent pupillary membranes, anomalies of the retinal vessels, lamellar cataracts, colobomata, microphthalmos and other deformities of the globe, and very high myopia. Haag found the same kind of thing in his cases.

Another point of importance as indicating the relationship between buphthalmos and juvenile glaucoma, is the frequency with which we find a marked increase in the depth of the anterior chamber in both classes of cases.

In dealing with the subject of senile glaucoma, there is still much difference of opinion as to the part played by **heredity**, but the advocates of the view, that even in adults, inheritance plays a strong part, include such authorities as

Priestley Smith, Hirschberg and Vossius. When we come to consider the juvenile form, we still fail to find uniformity of opinion, but at least the great balance of ophthalmological judgment is with the belief, that here heredity shows a more strongly marked influence than it does in the senile disease.

Haag has drawn attention to the common association of juvenile glaucoma with diseased conditions in other parts and especially with **disorders of nutrition**.

All forms of glaucoma, from the simple to the violently acute, are to be found in young people. In this connection Haag makes two surprising statements, viz.: (1) that congestive glaucoma is twice as common as the simple form in the young, and (2) that it does not favour either sex in the early decades of life. Loehlein, on the contrary, found that 62% of all cases in the young were of the simple variety.

The so-called **prodromal stage** is greatly lengthened in juvenile, as compared with senile glaucoma. This is usually explained by the yielding of the tunic of the eye, which is possible only in the young.

All writers agree that **myopia** is much more common in juvenile than in senile glaucoma. Thus Haag found myopia in 31% of his young cases, and in more than half of these, (17% of the total) the short sight was of a high grade. His figure for hyperopia was 28%, the rest being emmetropes. Loehlein found myopia in 50% of his cases as contrasted with 15% in the senile form. He made the interesting observation, that simple glaucoma was commoner in myopes and emmetropes, whilst the congestive disease bulked larger in the hyperopes, thus establishing a strong bond of resemblance between the juvenile and senile forms of the disease. Numerous observers hold that the tension of many myopic eyes is frequently above the normal. Gilbert⁴⁷ has gone so far as to say, that myopia is present in 30% of his cases of senile glaucoma. His experience would appear to be an uncommon one. It is necessary to remember, that the statistics we have been quoting come largely from Germany, a country in which myopia is common out of all proportion to what it is in Great Britain.

In connection with this association between glaucoma and myopia in the young, two possibilities present themselves: (1) that the myopia is an expression of the stretching of the globe under the influence of increased intra-ocular pressure, and (2) that both the myopia and the glaucoma may be de-

pendent upon some common cause. In any case we are safe in agreeing with Loehlein, that the relationship between the two conditions is not accidental. Beyond that it would be difficult to go. It is significant, however, that axial myopia of a high degree has been observed in the actual process of development in eyes, the subjects of glaucoma in young people. Such cases have been recorded by Loehlein⁴⁵, Puech, Gilbert⁴⁷ and others.

The **closeness of the relationship between the different forms of glaucoma**, can best be judged by a consideration of the phenomenon of "anticipation" in the hereditary form of this disease. The subject was first discussed by von Graefe, who illustrated his point by reference to families under his observation, in which glaucoma had affected three or four generations, and perhaps more. The symptoms of the disease in the later generations came on between 30 and 40 years of age, whilst in the earlier generations they appeared at 50 or 60. The matter was taken up and carried a good deal further by Lawford⁴⁸. Some of the pedigrees he quotes are of great interest from our present point of view. In one family the ages of appearance of the disease in three successive generations, were 71 in the first, 40 to 48 in the second, and 25 to 30 in the third. Another record is still more striking: in the first generation the trouble began at 40 years of age, in the second generation at 28 and 25 years of age respectively, and in the third generation five cases commenced between 17 and 28 years of age.

Lawford also gives a summary of the reports of hereditary glaucoma by Mules, Story, and Priestley Smith, in all three of which, "anticipation" was the prominent feature. Of these, Mules' cases stand out, since the age of attack in the first generation was 49, whilst the man's three sons developed signs of glaucoma between 15 and 18 years of age.

Phinizy Calhoun⁴⁹ has recently reported eight cases of glaucoma simplex in three generations of one family. In these "anticipation" was a prominent feature of succeeding generations, but the type throughout was steadily that of senile glaucoma. On the other hand, Wallenberg followed a type of juvenile glaucoma through four generations, and in these an increased depth of the anterior chamber was a noteworthy indication of the underlying nature of the affection.

Gilbert met with a couple, both of whom suffered from ordinary congestive senile glaucoma, whilst several of their descendants developed the juvenile form of the disease. Ger-

mann's⁵⁰ records resemble the preceding: a man suffered from senile glaucoma, whilst his son and two daughters developed the juvenile form.

Loehlein saw three sisters suffering from simple juvenile glaucoma, whilst the fourth was buphthalmic. Hirschberg⁵¹ watched a girl for years with buphthalmos in one eye, and infantile glaucoma in the other.

Not a few efforts have been made to classify **the various types of glaucoma, which we meet with in young people**. Of these the best appears to be that recently enunciated by Fuchs⁵², who recognizes the following groups:

(1) True glaucoma with a shallow anterior chamber; the disease tends to occur in several members of a family, and is hereditary: the patients are comparatively young; it is clinically, and perhaps pathologically, indistinguishable from ordinary senile glaucoma, with the one exception of the ages of the patients.

(2) Glaucoma caused by congenital malformations, such as defective development of Schlemm's canal, arrest in the development of the pectinate ligament, aniridia, etc. Such are congenital in clinical appearance, or else manifest themselves very early in life. They include buphthalmos.

(3) Glaucoma with a deep chamber and myopia. It may be questioned whether this group is not an artificial one; but the relationship of juvenile myopia to glaucoma has already been discussed.

(4) Secondary glaucoma, associated with keratitis punctata. The deposit on the posterior surface of the cornea may be so fine as to escape observation, and thus lead to an erroneous classification of the condition as "primary."

Luminous as this schedule is, its defects are obvious, but they have been already dealt with in the preceding pages, and all that can be done now, is to point out once again the need for careful observation of all cases of glaucoma, which occur earlier than ordinary. Below 40 years of age seems a good standard to take.

THE TREATMENT OF BUPHTHALMOS.

In 1899 Walter Pyle⁵³, of Philadelphia, published an exhaustive and luminous article on buphthalmos. His remarks on the subject of treatment are of special interest, as they were made before the day of the modern filtering operations. He

considered that the general consensus of opinion was against operative measures, and he pointed out, that though not a few successful cases had been published, there was good reason to believe that they only represented a minority of the operations performed; and that, if all alike had been placed on record, the results would have been much more discouraging. He laid stress on the difficulty of operating on children, and on the dangers of loss of vitreous, collapse of the globe, intra-ocular hæmorrhage, irido-cyclitis and panophthalmitis. He discussed paracentesis, the introduction of a seton, the injection of vitreous, iridectomy and sclerotomy. He commented on the great differences of opinion as to the value of iridectomy, and made the important point, that if an operation is to be done at all, it is imperative that it should be done as early as possible. He looked on the use of meiotics as being of little value, when employed alone, but of the highest service as adjuncts to operative measures. He laid great stress on the careful correction of errors of refraction, and comparatively little on constitutional treatment, though he would by no means neglect the latter.

The next landmark in the history of the subject may, we think, be taken to be Priestley Smith's⁵⁴ statement before the International Congress of 1913. He had made enquiries from a large number of British surgeons and summarized their replies in his report. As to the treatment of buphthalmos, the answers he received were very various, and many of them were extremely discouraging. On the other hand, some of his correspondents spoke favorably of the treatment of this condition by iridectomy, by repeated anterior sclerotomy, by Herbert's operation and by trephining. The interest of these observations is that they were made during a period, when the modern filtration operations were still quite new to the majority of surgeons.

It is of interest, therefore, to pass on to a review of a number of the most recently expressed opinions on the subject.

The first thing that strikes one in studying this literature, is that the advocacy of medicinal treatment alone, and of the operation of iridectomy has practically dropped out of mention, whilst the references to the newer operations have increased in numbers. Sclerotomy and cyclodialysis also appear to have gone completely out of favour.

The dropping of iridectomy is of the more interest, since

it is, after all, merely a harking back to the practice of the old masters of our craft, for de Wecker⁷⁷ wrote in 1901: "v. Graefe was in agreement with his colleagues, when he declared that iridectomy was dangerous (in buphthalmos) on account of the defects in the zonule, which laid the eye open to the danger of vitreous escape."

Jaeger⁵⁵ has performed Schloffer's operation (a modified iridencleisis) on five buphthalmic eyes, with an arrest of the condition in two of the cases. Wessely⁵⁶ also has published a successful result after an iridencleisis for buphthalmos.

David Priestley Smith⁵⁷ advocates his operation of limbal puncture, which he has performed in three cases with one success. Casey Wood⁵⁸ speaks well of his thread operation, the histories of which are admittedly very short. Allport⁵⁹ and Hay⁶⁰ have obtained good results from Lagrange's method.

Successful individual cases of trephining for buphthalmos have been published by Calhoun⁴⁹, Wessely⁵⁶, Zentmayer²⁹, Hamilton⁶¹, and Hugh Jones⁶². Mayou⁶³ relieved the tension of buphthalmos by trephining, but the scotoma in one of his two cases continued to advance toward the fixation point. P. H. Adams⁶⁴ obtained a good result after double trephining and a Herbert operation in a 5 months old child. Fage⁵, whose valuable work on buphthalmos has already been quoted, lays it down as an axiom, that whatever is done in the operative treatment of buphthalmos, the incision must be kept as small as possible in order to avoid the dangers of vitreous escape, lens luxation and intraocular hæmorrhage. To his mind this rules out the operation of iridectomy. He has sclerectomised 14 cases and considers that the Elliot operation offers the following solid advantages:—(1) simplicity, (2) the small size of the opening in the tunic, and (3) the possibility of repetition of the procedure if necessary. He lays stress on the rule that whatever operation is done, it must be done early. In giving expression to such a view, he is at one with Pyle⁵³ and Boehm²⁸ and, we venture to think with the great body of sound ophthalmological opinion.

Zentmayer²⁹ analysed the replies of a number of surgeons, whom he asked to state their opinion as to the best operation for hydrophthalmos. Iridectomy was reported to have given fair results in 42% and poor in 58%, sclerotomy fair results in 28% and poor in 72%; sclerectomy satisfactory results in

40%, encouraging in 20% and unsatisfactory in 40%. Meiotics had proved unsatisfactory on the whole and paracentesis was a failure. The Elliot operation was reported as having given the best results of any procedure.

Herbert⁶⁵ has opposed sclerectomy on the ground that it is dangerous to empty the large and deep anterior chamber; in its stead he advocates subconjunctival puncture with a 1 mm. Graefe knife. In none of his patients was the escape of aqueous sufficient to empty the anterior chamber, yet in all of them there was a temporary fall in vision, which he attributed to circulatory embarrassment from the sudden loss of support to degenerate and weakened blood vessels. He thought that the stasis was incomplete and passed off as the leakage from the chamber lessened. The very same sequence of events, which Herbert here records, may be seen after trephining, not only in buphthalmic eyes, but also, and comparatively frequently, in senile glaucomatous eyes. With every deference for Herbert's opinion, a more simple explanation of the phenomena in question in some cases at least appears to be, that the refractive power of the lens system is temporarily altered by its advance towards the cornea, and is subsequently restored as the anterior chamber fully reforms. The writer has trephined on a number of occasions for buphthalmos, and though he would be very far from claiming that this or any other operation is certain to give invariable success in the treatment of this very difficult disease, he can at least look back on most encouraging results. Apart from those whose names he has mentioned, he has met with and heard from a number of surgeons in the East, in Canada, in America and in Europe, who have had good results from trephining their buphthalmic cases. Lastly Professor Meller⁶⁶ has spread the aegis of his powerful advocacy over the method.

There are some technical points of importance in connection with the operation, when performed on the large buphthalmic eye.—(1) The conjunctiva strips back off the cornea to a very unusual distance and with great ease. There is, therefore, no difficulty in placing the trephine far forward; indeed, *the usual step of splitting the cornea is not called for in these cases.* (2) The chamber is so very deep that the trephine can be used with considerable boldness. (3) The tunic of the eye is sometimes very thin, so that it is quickly penetrated. In

this connection Hamilton has observed that the tunic of the eye offers little resistance to the cutting blade, and thus makes the operation difficult. Contradictory as this statement may appear to be, there is a distinct element of truth in it, and it is not always easy to cut out a clean disc from one of these eyes. To make a hole, which shall prove to be permanent, is, however, usually easy enough. (4) A real obstacle is sometimes presented by the disproportion in size between the eyeball and the orbital opening. This renders it difficult to get far enough back to make a flap. An anaesthetic must be used; assistance may be obtained by having the eye grasped below the cornea and rotated downward by a backward push; an eyelid retractor for the upper lid may also be of value: once the conjunctival flap is cut a strabismus hook, or a pair of strabismus forceps, engaging the superior rectus tendon, will prove of great value in the later stages of the operation.

The writer has under his care at the present time a young lady, who had been refused operation by very competent surgeons, and who felt her way into his consulting room with outstretched hands. She had never read a word; her education was neglected, she was flabby, anaemic and miserable. Today, two years after trephining, she has made good some of her lost childhood, she walks with her head erect, rides a bicycle in quiet places, reads, sews and does her lessons with other children. Such cases are not uncommon after operation and are amongst the most gratifying that many of us can look back upon.

Be the method what it may, whether iridectomy, sub-conjunctival paracentesis, Lagrange's operation, trephining or any other procedure, the writer holds most strongly that the essential factor of success lies in the production of a filtering scar. Our knowledge of the pathology of buphthalmos makes it obvious, that nothing less than the production of a vicarious channel for the escape of intra-ocular fluid can be of any avail. We know that it is the channels of excretion that are blocked, and if we cannot provide a sufficient safety-sluiice, our procedure is doomed to failure. In dealing with senile glaucoma, one may argue as to the rôle of a larger or smaller, a more peripheral or a more central removal of iris tissue; here we are shut up to a congenital absence of the canal of Schlemm, or a congenital defect in the pectinate ligament. The writer

has often contended, on clinical grounds, that the cure of a senile glaucoma by means of iridectomy or sclerotomy is frequently due to the accidental establishment of permanent filtration. If this be so in the case of senile glaucoma, he feels convinced that it will prove equally so in the pathologically simplified instances of buphthalmic eyes.

There are many ways of obtaining a filtering cicatrix. Some, such as sub-conjunctival paracentesis, may require less technical skill than trephining, but the writer believes that there is no surer and at the same time safer method in buphthalmos than the use of the trephine.

Before leaving the subject of treatment, there is a last and a very important word to be said, viz., that we must never forget the possibility that congenital syphilis may be playing a part in any case of buphthalmos, and that we must consequently order our methods of diagnosis and our therapy in the light of this knowledge. The surgeon who relegates this side of the question to the background of his mind is forfeiting some of the power with which modern science has equipped him for the treatment of the disease.

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THE OCULAR COMPLICATIONS OF ANTERIOR POLIOMYELITIS.*

(With Illustrative Cases)

BY

WM. CAMPBELL POSEY, M.D., AND WALTON C.
SWINDELLS, M.D.,

PHILADELPHIA

Case 1. Atrophy of both Optic Nerves. Paralysis of Left Abducens.

W. T., Jr., male, aet. 7 yrs., seen in consultation with Dr. Fronfield of Media by Dr. Posey. Notes of C. A. Norris, M.D., of Manasquan, N. J.:

"W. T., Jr., began to complain of pain in back of neck on August 21st, but he was around the house and apparently not very ill, as I was not called to see him until August 23rd. He then complained of frontal headache and pain in back of neck. Temperature was 101°, pulse and respiration ratio was not changed; he had some twitching about the face muscles; no rigidity; reflexes were normal and co-ordination was good. August 24th the paralysis appeared. From this time he went through the usual course and was apparently recovering until September 9th, when he complained of diplopia, and a few days later of failing vision. Thinking the ocular symptoms were dependent upon increased intracranial pressure, a lumbar puncture was performed on September 16th, without, however, producing any change in his condition."

Notes of Dr. T. LeBoutillier, of Philadelphia:

W. T., Jr., seen by me September 16th, at Manasquan. Taken sick August 19th with diarrhea, high fever, headache and pain in neck. Paralysis developed three days later, complete in left arm and right leg. No other paralysis or signs of meningitis. About September 2nd, motion in arm and leg returned slowly. On the 16th all movements of the leg and forearm complete, still slight deltoid paralysis. His general condition was fair. On September 12th there was diplopia, due to paralysis of the VIth nerve.

Is not interested in anything, does not want to talk. Appetite good, stools normal, sleeps well. When seen, complaining of pains in head, neck, chest, arms, back and legs. This

*Read before the Wills Hospital Society, October 3, 1916.

transient and changeable. Total blindness, widely dilated pupils, slightly greater on the right side. Knee jerks very sluggish; plantars marked. By lumbar puncture removed 37 c.c. of crystal clear spinal fluid under pressure. Within half an hour headache and all pains had disappeared, child laughed for the first time in weeks, slight reactionary hysterical attack. Cell count twenty-four hours later showed 17 cells to c.mm."

Examination by Dr. Posey, September 25, 1916: Child exhibits purposeless gaze of the blind. As far as can be ascertained, all ocular movements good with the exception of outward rotation of left eye. Pupils large and non-reactive. Total blindness in each eye. Child seems, however, to be able to perceive the flashes of a strong electric lamp. Media clear. Both optic nerves grayish white and outlines sharply defined. Marked reduction in the size of the retinal vessels, no hemorrhages. Diagnosis—Paralysis of left VIth nerve, with simple optic atrophy.

Remarks: Implication of the optic nerve in anterior poliomyelitis is exceedingly rare. In his article in Graefe Saemisch *(XI 2 p. 308) Uhthoff says the literature contains no mention of the optic nerve being affected in these cases. Wickman, however, in Lewandowsky's Handbuch der Neurologie *(Vol. 11 p. 856) reports having seen optic neuritis in one instance and refers to an observation of Tedeschi of a case which exhibited total amaurosis and left optic nerve atrophy. The optic atrophy in the case of W. T., Jr., can probably be referred to a complicating meningitis, though the temperature became normal one week after the onset of the disease and there was no recurrence. The atrophy, however, is not the post-neuritic variety usually observed following a descending inflammation of the optic nerve such as is common in meningitis and may have developed primarily by the action of toxins generated by the disease upon the nerve trunks themselves. Although the attending physician, Dr. Fronfield, was counselled to try the effect of strychnia injections into the temples, a gloomy prognosis for the restoration of any vision whatever was rendered.

The remaining cases illustrate paralysis of ocular muscles occurring during the course of anterior poliomyelitis.

CASE II. Male, aged 7 yrs. History negative. No sickness until Sept. 1910, when he suffered from a severe scald of the arm, side and leg. Several weeks later, during the

healing process, an acute attack of illness supervened, temperature 100° , the illness being thought to be due to dentition of canine teeth; the child was not very sick. About the first of November, paralysis of the muscles of left side of face, appeared, but in no other region of the body. The patient's father (a doctor) was attending a sporadic case of anterior poliomyelitis at the time (there being a few others in the community, but no epidemic) and the appearance of the disease in his own child naturally gave rise to the possibility of the disease having been transmitted in that manner.

In November 1910, patient had a violent poisoning from strychnine, which he obtained while in charge of a nurse. He became cyanotic with frequent convulsions and was only relieved by the utmost persistence, venesection, salt sol., etc.

Treatment: Electricity, hand and mechanical massage, eye glasses for slight errors in refraction, tonics, etc. This was followed by slight improvement in the use of the muscles of the face, eyelids and lips. There was less overflow of tears and slightly less internal squint.

The patient was seen by Dr. Posey in March 1916, and a diagnosis made of paralysis of the left VIth and VIIth nerves, there being slight left lagophthalmos with epiphora and incomplete closure of the palpebral fissure, with diminution in the external rotary power of the left eye, and a convergent strabismus of 35° . Corrected vision was normal in each eye and there were no changes in the eye-grounds.

CASE III. A male child 5 years old reported at the Wills Hospital in September 1916, with marked ptosis in each eye. There was no involvement of the extraocular muscles and the eyegrounds were normal. In addition to the limitation in motion of the upper lids, the epicanthal folds in each were somewhat broad and the general facial appearance awakened the suspicion of the ptosis having been congenital. The father of the patient insisted, however, that this was not the case, and that the lids had been in a proper position before an attack of illness which the child had suffered 6 weeks previously and which was diagnosed by the city health authorities as infantile paralysis.

CASE IV. Notes of Dr. Swindells: Male, aet. 7 yrs. Illness began 8.27.16 with persistent vomiting, headache and a temperature of 102° . Double vision complained of on the following day. Fever and general symptoms rapidly subsided but

diplopia persisted. When seen by Dr. Swindells on August 30th there was complete external ophthalmoplegia, the eyes being fixed and immobile. The pupils were uninvolved and reacted normally to light. Vision also was apparently normal. There were no changes in the eye-grounds. After a persistence of several weeks, the ocular palsies gradually disappeared, so that when the case was last seen by Dr. Swindells, a few days ago, no trace of them could be found, the eyes having made a perfect recovery.

Although paralysis of eye muscles in anterior poliomyelitis is rare, Wickman (*loc.cit*) believes that they occur much more commonly than is generally accepted. He states that he personally had noted a combination of abducens and oculomotor palsies and an involvement of the trochlearis in some cases. The affection is usually unilateral; in the Vienna epidemic of 1909, however, one case was reported which exhibited bilateral external ophthalmoplegia. Marked ptosis, though incomplete, was also noted in both eyes. Accommodation and convergence were preserved.

Takahashi saw a similar case in the same epidemic, characterized by paralysis of the trochlear and external oculomotor branches, with a slight paralysis of the facial and left hypoglossus nerves. Wickman states that in most of the cases of unilateral ophthalmoplegia, the levator palpebralis escapes. Ptosis can, however, be an isolated symptom. Nystagmus has been observed by Medin, Edward Müller and Netter.

According to Uthoff, the facial and abducens are the nerves usually affected, the oculomotor being but rarely implicated. Of 49 cases of infantile palsy examined by Medin (cited by Uthoff, *loc.cit*) oculomotor paralysis occurred once, ophthalmoplegia externa once, and facial palsy in several instances. A pathological examination in several of the cases which terminated fatally showed nuclear lesions. Uthoff claims the ocular palsies are dependent upon cerebral, medullar and meningeal complications and are not found in simple uncomplicated cases of anterior poliomyelitis.

DISCUSSION.

Dr. Weisenburg commented as follows:

I am of the opinion that all cranial nerve palsies occurring in infantile paralysis are due either to a nuclear or intramedullary lesion. There is no question about the 7th and 6th nerve

paralysis being intramedullary because the intramedullary portion of the 7th nerve runs around the nucleus of the 6th and a lesion in this part of the pons is bound to cause paralysis of both cranial nerves. An accompanying 5th nerve paralysis is due to the same reason. Unilateral and bilateral ocular motor palsies are either nuclear or intramedullary in origin.

Optic atrophy occurring in infantile paralysis is usually ascribed to meningeal complication and yet I am doubtful of this. In the case reported by Dr. Posey the history is that the child first had twitchings in the face and when examined later had paralysis of the left arm and leg. Dr. Posey found paralysis of the left 6th nerve. Can it be that the child had a left hemiplegia and that in addition to the diffuse cerebral lesion which caused the hemiplegia, could it not have had lesions in the external geniculate bodies on one or both sides. Dr. Posey himself is in doubt as to it being due to meningitis because he states that the type of atrophy present is not of the type usually found following meningitis and suggests the possibility of it being due to a toxemia. I believe optic atrophy found in infantile paralysis is either the result of a toxemia or nuclear lesions.

I am somewhat in doubt as to the meningeal origin of cranial nerve or other palsies in infantile paralysis. From my experience in this epidemic of which I have now studied roughly over five hundred cases I have failed to detect what I would consider either an anterior or posterior root lesion due to meningitis or a cranial nerve lesion due to meningitis, for while the pathology of the disease is undoubtedly a meningo-myelitis, yet the meningeal lesions are not sufficient to cause pathological manifestations for any length of time. Clinically the meningitis causes pain. This is either promptly relieved by lumbar puncture or it disappears gradually and in a few weeks time all pain disappears. If the meningitis should cause a cranial nerve palsy it would by the same reason cause an anterior root palsy or a posterior root palsy none of which has ever been observed in this disease. We can then conclude that from the clinical standpoint meningitis in infantile paralysis does not cause cranial nerve palsies.

A French manufacturer has donated the sum of 35,000 francs to the Association Valentin Haüy for the welfare of the blind. This gift represents the donor's profits on war munitions.

THE SPONTANEOUS EXPLOSION OF SNELLEN IMPROVED ARTIFICIAL EYES.*

BY

ALEXANDER S. ROCHESTER, M. D.

CHICAGO.

The phenomenon of the spontaneous explosion of Snellen improved artificial eyes was definitely brought to my attention a few months ago by a report from one of Dr. Casey Wood's patients, which told of having had two different eyes explode within a short space of time, each accident happening while the eye was being worn in the proper manner. Thinking it might prove interesting and, at the same time, develop some facts of value, a short notice was inserted in the *OPHTHALMIC RECORD*, requesting a report on any cases of this kind that might have come under the observation of the readers. In response to this request, I have received twelve replies from different physicians telling of eighteen occurrences of this nature that have happened in their practices.

As to the particulars regarding the circumstances at the time of the explosions, all the cases present histories of a more or less similar type. The story as told by the patient is generally on the order of the following: He will state that while engaged in some normal occupation or pastime, he suddenly heard a report as if a pistol were shot off in close proximity to his head, at the same time he felt a sharp pain in the affected orbit and on placing his hand to the part, found the eyelids covered with blood. Quite naturally he generally tells that he was greatly frightened and immediately consulted his oculist.

The replies from the physicians to whom these patients reported, show that none of the orbits sustained serious damage. In 88% of the cases there was some abrasion of the orbital lining membranes, varying from a slight cut which healed in several days, to deep lacerations which required two weeks in healing. From one to ten pieces of broken glass were found, in most of the cases, imbedded in the soft tissues and had to be extracted by the attending doctor. Two of the patients lost consciousness, but this was in each case due entirely to fright and occurred in individuals of a hypersensitive nature.

Quite a number of the patients state that their first impres-

*Read before the Chicago Ophthalmological Society, Nov. 20, 1916.

sion at the time of the accident was that they had been shot in the eye and even some of the bystanders have heard the report and seeing blood running from the orbit, have, for the moment, held the same opinion. Each explosion reported was absolutely spontaneous, there being no cause to which the individual could attribute it.

The receipt of this series of reports has shown that the spontaneous rupture of the Snellen improved eye, while being worn in the orbit, is not a remarkably rare accident. In fact, I have found through interviewing one of the large manufacturers of artificial eyes, that during the course of a year they will probably lose twenty-five eyes by spontaneous explosion, this occurring while the eyes are stored on shelves and from a stock numbering twenty-five thousand. This means that one-tenth of one per cent of the improved eyes manufactured may be expected to explode, even though they be lying quietly packed away and not subjected to the many vicissitudes encountered by the eyes while in use.

In attempting to find the cause of these explosions, the method of manufacture was first studied and the manufacturers themselves interrogated. The makers state that in producing the Snellen improved type, it is absolutely necessary to seal the back of the eye while the whole ball is at a white heat. This naturally results in a partial vacuum of rather high degree in the interior of the globe, after cooling has taken place. There is, therefore, a continuous pressure being exerted on the outside of the finished eye. If there be a sudden change in the temperature of the globe, or a decided inequality in the temperature of different parts of the globe, the resulting sudden or unequal expansion or contraction renders the glass less strong and, therefore, less able to withstand the continuous atmospheric pressure.

It has been found that most of the explosions have happened during either very hot or very cold weather. In this series of cases at least one-half are said to have happened on exceptionally hot days.

The fact that the globe is built up of many different grades and colors of glass, and that the walls are in the finished state of many different thicknesses, makes the proper annealing of the whole a very difficult problem. This one problem of completely and successfully annealing the eye so that it will be absolutely impervious to all changes and conditions of tempera-

ture, is something that has not yet been accomplished by the makers. They state that a great deal of study has been put on the subject during the past years and one large manufacturer states that as soon as the present rush of business, brought about by the great demand from the European battlefields, is past, they will again take up the problem.

The other one deficiency of these eyes, and one which influences the possibility of explosion, is their susceptibility to the destructive effects of orbital discharges of certain patients. It has been found that certain individuals can wear an eye no longer than six months before discoloration and corrosion is seen to have begun. Others can wear the same kind of an eye for two years before any signs of deterioration are seen. The effect of the influence of certain person's secretions on the glass is shown in this series of cases. Out of eighteen explosions reported, four patients had experienced the accident two distinct times. In other words, out of all the cases reported to have had the improved eye explode while in the orbit, 28% had had a repetition of the phenomenon. When we consider the very small percentage of those wearing artificial eyes who have them explode in their sockets, and then realize that 28% of these who have had the accident occur, have had it occur twice, the conclusion drawn must be that the individual socket exerts a deleterious influence on the glass; the only plausible explanation of this being that it is brought about through the chemical action of the secretions on the globe.

7 West Madison St.

A CASE OF BLEPHAROCHALASIS—A VARIETY OF DERMATOLYSIS.

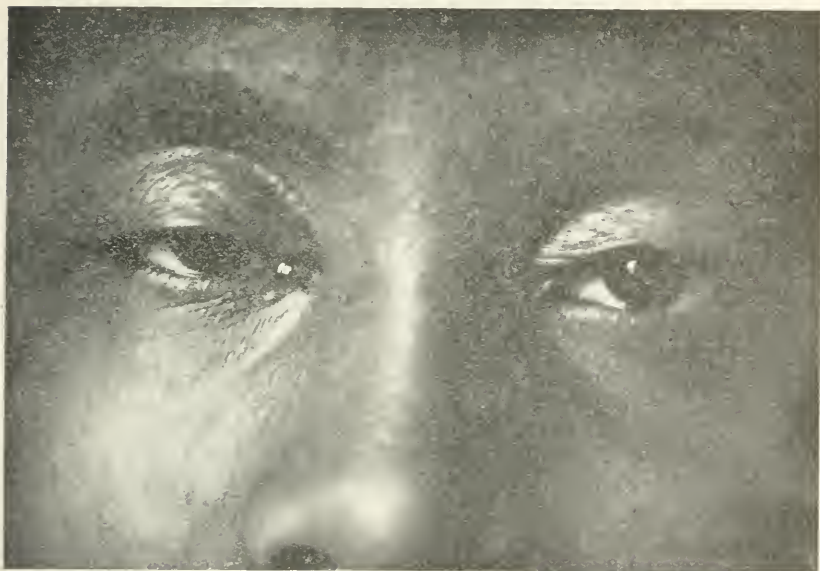
BY

ROBERT L. RANDOLPH, M. D.,

BALTIMORE, MD.

Alice Price, aged fifteen, has had since birth an unusual condition of the upper lids, consisting in considerable looseness of the skin and thinness of the connective tissue in this situation. One can also notice lichen-like changes in the lids, which no doubt account for the periodic attacks of itching which occur from time to time and which provoke a great deal of scratching and consequent swelling of the lids. For weeks at a time, however, the relaxation of the skin is the only trouble present. This relaxation, atony, or dermatolysis, or, as Fuchs

suggests, blepharochalasis, is a very rare disease, and only a few cases have found their way into literature. According to Fuchs,* the trouble is always bilateral. The skin, owing to its loss of elasticity and thinning, is thrown into countless folds criss-cross in all directions, such as one sees in advanced senile atrophy and relaxation of the skin, and, as Fuchs describes it, presenting a tissue-paper-like appearance. Very frequently there are, at the most convex point on the lids, numerous small dilated veins, such as one sees in elderly persons with red cheeks. There is no hypersensitiveness of the skin. The changes, as will be seen, are pronounced between the eyebrow



Blepharochalasis. Much magnified picture. Shows characteristic tissue-paper-like wrinkling in the skin of the upper lids.

and the upper edge of the lid. In conclusion, it should be said that the disease is one of early childhood, starting at puberty. It must be said, however, that, so far as I can learn from the mother, this child has had it from earliest childhood. The accompanying photograph shows well the condition described. Two cases are reported by Weidler** and two by Stieren.†

* Wiener klinischer Wochenschrift, No. 7, February, 1896.

** Trans. Amer. Med. Assoc., Section Ophthalmology, 1913.

† Trans. Amer. Ophth. Soc., 1914.

DISCUSSION.

DR. EDWARD B. HECKEL, Pittsburgh, Pa.: Dr. Randolph's patient apparently presents the condition usually described as blepharochalasis, and in this case is bilateral and shows no ptosis. I have under observation a girl of fifteen, with typical so-called blepharochalasis involving one eye only, and with a well-marked complete ptosis, which raises the question whether or not ptosis is not always a concomitant condition in monolateral cases and always absent in bilateral cases. In my case the condition followed repeated attacks of swelling of the lid, very likely an angioneurotic edema.

DR. EDWARD STIEREN, Pittsburgh, Pa.: This in my opinion is a typical case of blepharochalasis, having the lax, redundant integument with the wrinkled cigaret paper appearance of Fuchs. By palpating under the upper rim of the orbit rounded bodies can be felt, which no doubt is orbital fat coming forward. When the patient leans forward, the fulness of the upper lids is much increased—a diagnostic point to which I referred in my article in the Transactions of this Society for 1914. An interesting feature of Dr. Randolph's case is that the condition appears to be congenital; whereas in the majority of reported cases it occurred early in puberty.

**FACIAL PIGMENTED NAEVUS INVOLVING THE
SCLERA.**

BY

WILLIAM ALLEN PUSEY, M.D.

CHICAGO.

The interest in this case lies in the fact that along with a pigmented naevus on the cheek there was a dense deposit of pigment in the sclera. The patient was a young Chinaman, a university student, who had on the right side of his face a flat, brown to black naevus. It was practically flat and showed no increase of hair. It involved the skin to a considerable extent on the side of the nose, the cheek, the eyebrow, temple and forehead on the right side of the face.: It did not involve the skin immediately around the eye except for a part of the lower lid. The same dense increase in pigment was found for almost the entire area of the sclera. There was a wedge shaped area of normal white sclera at the inner side of the eye. The rest of the sclera was a blue slaty color. The naevus was present upon the inner surface of the lower lid, but did not involve the upper lid.

The accompanying illustration shows very well the pigmentary involvement of the eye. The color did not photograph well, so that the eye has been re-touched in the picture, but this picture does not exaggerate the natural pigmentation. Of course from the embryology of the structures it is not surprising that a congenital defect in the skin of the face should show upon the eyeball, and yet in my experience with a large number of pigmented naevi in this part I have never seen this involvement before. For that reason it seems to be worth recording.



Showing Scleral Involvement in Pigmented Naevus of the Face.

A CASE OF CONGENITAL SUPPURATIVE CHOROIDITIS WITH MICROPHthalmOS.

BY
ROBERT L. RANDOLPH, M. D.

BALTIMORE, MD.

On the fifteenth of April, 1916, I was called to see an infant which was said to have been born with one eye smaller than the other. I found the child a well-nourished one and with an absolutely healthy mother who had two other little children the elder being six years old. The baby had been born at full term and was now ten days old. The doctor (Dr. William Mason, The Plains, Va.) had noticed at birth that the left

eyelids were somewhat swollen and the eyeball was apparently smaller than the other. There was no exudate in the conjunctival sac but there was a well-marked pericorneal zone and a grayish reflex from the depths of the eye. It may be said here that the eyeball was hardly more than half the size of the other one. The pupil was unevenly dilated as a result of atropine disclosing several old adhesions. The grayish or yellowish exudate occupied the inner or nasal half of the vitreous. The tension was minus. The condition was precisely what we recognize as metastatic or suppurative choroiditis or uveitis which one sees now and again in the acute infectious diseases, meningitis, diphtheria, erysipelas, grip, etc. It might be added that there was not the slightest evidence of infection from any source from the side of either the child or its mother. The condition looked as though it had been present for a month and was gradually subsiding, causing as it usually does, blindness. It is no very uncommon thing to see cases of microphthalmos which no doubt originated as this one did, in suppurative uveitis early in pregnancy, and at birth presenting the small eye but with no evidences of acute inflammation. In this case, however, the process started in the last weeks of pregnancy and at birth presented the typical picture of an acute process in the uvea which did not seem to come to an end till some weeks after birth. There has been no apparent diminution in the size of the eye since birth. It still remains about half the size of its fellow. It is a pretty typical microphthalmic eye now.

ANOPHTHALMOS.

BY

HAL R. WRIGHT, M. D.,

COLUMBUS, OHIO.

In reviewing the literature back to and including 1912, I find four cases of anophthalmos and nineteen cases of microphthalmos reported; probably some few cases have not been reported and I would hesitate to report this, were it not for one distinguishing feature that I have failed to find in literature at my command.

I. R. K., female, born March 8th, 1916, normal labor, perfectly normal child excepting the absence of both eyes, and has been and is in perfect health at this time (March 24, 1916).

The lids are sunken, cilia regular, the edges and conjunc-

tiva of lids are slightly red, puncta appear normal, palpebral slit 14 mm. in length.

The sockets are small and lined with apparently normal conjunctiva. At its posterior pole there is a small black elevated spot $1\frac{1}{2}$ mm. in diameter, about which is a ring of normal conjunctiva 1 to $1\frac{1}{2}$ mm. in breadth; radiating from these are blue-black lines from 2 to 3 mm. long; about and between these lines the conjunctiva appears normal

This condition was found in both sockets.



Fig. 1. Showing eyelids in anophthalmos.



Fig. 2. An attempt to show the peculiar arrangement of pigment of the conjunctiva found in both sockets.

This peculiar marking of the conjunctiva was striking in that it resembled the pigment arrangement of the iris, only not as distinct.

Palpation disclosed nothing that would indicate the presence of as much as a rudimentary globe in either socket.

The child died in its 5th week from an attack of measles.

The *Anales de Oftalmologia* of Mexico City has discontinued publication.

REPORTS OF SOCIETIES

SPANISH-AMERICAN OPHTHALMOLOGICAL SOCIETY.

(Tenth Annual Meeting, held at Valence, Spain, Sept. 20th-23d, 1916.)

A REVIEW BY

DR. JUAN SANTOS-FERNANDEZ.

OF HAVANA, CUBA.

SEPTEMBER 20TH.

The members were received at the Medical Institute of Valence where the first session was celebrated.

DR. MANUEL MENACHOS presided.

DR. SANTOS FERNANDEZ presented a paper on cataract. He first dealt with senile cataract. He stated that there are other kinds of cataracts which should be operated, each according to its nature; these are the cataracts of youth, congenital cataracts, traumatic cataracts and capsular circumscribed cataracts that are also congenital. In these the operation by extraction should not be made but the dissection is enough. The author cited numerous cases to prove his opinion and concluded in the following way:

Cataract operation has reached the greatest perfection in this age and with any of the usual methods if done by experienced hands there are obtained magnificent results; but if one wants to adopt a method that puts him under cover against any danger one should perform the extraction with iridectomy and conjunctival flap.

In the cataracts of youth sometimes hurry causes the loss of the eye of the patient. One should learn how to wait and not to be impatient. In capsular congenital cataracts we ought to operate when we can during childhood in order to obtain an aphakic eye where the error of refraction can later be corrected.

DISCUSSION.

DR. MANUEL MARQUEZ spoke with discretion about Smith's operation stating that it is not a new operation but that in Smith's hands it had given splendid results, that have not been repeated in their respective localities by the numerous surgeons who have seen and tried it. From that he believes that his successes are due more to his extraordinary large practice and to

the thousands of cases he has operated upon, most of which were about forty years of age.

He dissents from Dr. Santos Fernandez in the matter of iridectomy, not believing that it should be systematically done, but only on certain cases. He accepted the corneal suture when there is immediate danger of vitreous prolapse and mentions a case of his of foreign body of the lens in which after the extraction of the lens there came a prolapse of the vitreous that was stopped by the tying of the corneal sutures.

DR. TOMAS BLANCO, professor of ophthalmology of Valencia, described his own method of cataract extraction with conjunctival flap and recommended a simple dressing held by collodion.

DR. SUÑER seconds the enthusiastic welcome given to Dr. Santos Fernandez and is in favor of Galezowski method, without iridectomy, also in favor like Dr. Marquez of not using the preoperative occlusive dressing because it irritates the eyes. Dr. Suñer operates on eyes with catarrh and has had no bad results from that procedure.

DR. CASTANER spoke about the conjunctival flap and agreed that iridectomy has to be done in certain cases.

DR. WIEDEN VINARTA, stated that not having had a large personal practice, he had seen most of his father's and thus is able to enter the discussion. He is in favor of Dr. Blanco's method by conjunctival flap and is in favor of the bacteriological examination of the ocular secretion before the operation. He accepts iridectomy in cases of asthma and in corneal suture and ends by accepting the Official Symposium.

DR. CASTROVIEJO is in favor of iridectomy only in certain cases. Is not afraid of introducing many instruments inside of the eye, if they have been sterilized by fire and describes his method.

DR. PALOMAR DE LA TORRE demonstrated on the board his method and the places where the incision is made. He is against the opinion of not practicing the operation on the children.

DR. VIDAL mentioned the role of the lachrymal ducts in cataract operation and believes that when they are involved iridectomy should be done.

DR. LEON ORRIZ is of the same opinion as Dr. Palomar de la Torre. Agrees that the preventive dressing irritates the eyes.

He believes that in many cases iridectomy has to be done and is in favor of the conjunctival flap.

DR. DOMINGUEZ ROCA mentions the opinion of his teacher DR. AGUILAR BLANCH who makes the dissection of the capsule with the knife and practices iridectomy in some cases.

DR. MENACHO agrees with the official Symposium and so stated when he made a review of Dr. Santos Fernandez's paper which he called the "American Method."

DR. WIEDEN read some points in connection with the subject and declared himself in favor of the conjunctival flap.

DR. TOMAS BLANCO read his paper on the extraction of senile cataract. He is an adherent of the conjunctival flap and of iridectomy.

DR. SANTOS FERNANDEZ closed the discussion.

SECOND SESSION—SEPTEMBER 21ST, THURSDAY.

The meeting was opened at 4 o'clock, Dr. José Castañer from Valence in the Chair.

DR. VIDAL TRAXANET, from Barcelona, read a paper on "The Preparatory Subjects after the Operation for Cataract." He mentioned the several points to be taken care of and begins with the ocular dressing that consists in a band of light plaster over both eyes and a light night cap. The patients should not be much moved about after operation and it is better to operate them in a hospital. They should be allowed to sit up in bed after twenty-four hours and if they are excited one should administer some soothing medicine. The author specially recommends watching the temperature. He changes the dressing after twenty-four hours and during the first few days tends to keep the pupil dilated and we agree with him in this, but not in the use of vapor irrigations because we know that if infection is avoided during the operation, nature does the rest. We believe that the author orders correcting lenses too soon after operation, for we do not think that this should be done until after the eye is free from any inflammation, first because it would tend to produce an iritis and then because the results would change very soon.

DISCUSSION.

DR. WIEDEN, VINARTA, believes that there is no reason to cut away the eye lashes. He is against the selection of glasses after eight days because the cornea has not recovered its normality in that short time.

DR. FIGUERAS PARÉS is also against the cutting of the eye lashes and mentions a case in which after being cut they went into the retrotarsal folds causing an ectropion. He is in favor of having cataract cases operated in the hospital because there is immediate attendance and approves the temperature charts because they may indicate an infection.

DR. PALOMAR DE LA TORRE, from Zaragoza, is not in favor of moving the patients about, but when in need of doing so has had no untoward results.

DR. MENACHO gives great importance to the post-operative attendance and believes that he has originated an ideal dressing which consists in a narrow piece of gauze that runs over the eye from the forehead to the cheek and when there is some secretion it is easy to take it away without moving the eyelids much. He changes the dressing after 48 hours. Does not pay attention to the temperature and is against cutting the eye lashes, which he does only when there is distichiasis.

DR. LEOZ received from Dr. Vidal the assurance that his examination after eight days is only provisional.

DR. WIEDEN, (Senior), although he has seen the Germans, Italians and Japanese cutting the eye lashes, he believes that many times they get inside.

DR. MARQUEZ has cut them but once noticed that in case of vitreous prolapse he needed them and had to make a tarsorraphy.

DR. SANTOS FERNANDEZ mentions that until last year he had not seen this done, but that then he saw it done by many authorities and though he supposes that they have some reason to do so he has not tried to imitate them.

DR. BENAVIDES does not cut the eye lashes because he uses a lid retractor that covers them.

DR. MARQUEZ read a paper on *Transparent Ectasia of the Cornea*, that is very original. He begins mentioning the scarcity of bibliography on the subject and the few authors that had given some time to this affection had considered it a dystrophy, but Terrier had proved that it was not so. The author mentions the case of a man 46 years old that he had seen in December 1914. The right eye on its upper part had a semi-lunar portion that looked like an *arcus senilis* not complete and there is a propulsion forward of the ulcerated region. Contrary to all specifications about keratoconus, in this case the

ectasia was not in the center of the cornea. This distension has produced very naturally some errors in refraction and astigmatism, but the nature of the disease has not been clearly defined yet, and it was impossible to do so because the patient did not come back.

DISCUSSION.

DR. MENACHO has observed some cases with similar symptoms and that he considered as dystrophies of the cornea brought about by superficial peripheric ulceration.

DR. WIEDEN, VINARTA, asks if in Dr. Marquez's case there were any trachomatous data.

DR. MARQUEZ believes that it was a congenital case.

DR. MENACHO states that in his cases there were at least two with trachoma.

DR. WIEDEN (SENIOR) read a paper on "The Procedure of Dr. Lagleyze for Glaucoma" with many observations of his own and mentions all that has been done to obtain ocular drainage and mentions Mr. Elliot's efforts in the past few years. He ends mentioning Dr. Faloni's experiences in Italy.

DR. FIGUERAS PARÉS made some remarks on Elliot's operation and mentioned the difficulty in making the flap up to the cornea without wounding the sclera.

DR. VIDAL pointed out the advantages and disadvantages of Elliot's procedure and practices it from outside in when there is no anterior chamber.

DR. WIEDEN, VINARTA, states that it is not enough to make the conjunctival flap but the epi-scleral tissue must be included. The operation is difficult and sometimes the flap is perforated.

DR. WIEDEN (SENIOR) says that to make the flap easier it should be done over the transparent cornea.

DR. MANUEL MENACHO read a paper on *Glaucoma Following Secondary Cataract* that is not frequent. Bowman published the first observation. The author mentions that it is not agreeable to describe the failures but they tend to help because they give us a lesson. He describes the perfect method followed in the cases where there was a discission followed by glaucoma and as he has found no explanation for them he wants to mention them.

DR. SANTOS FERNANDEZ is of the same opinion as Menacho that the failures give us more instruction than the cases with good results. He describes a case of discission fol-

lowed by detachment of the retina. The patent changed surgeons to operate his other eye and there came a phlegmon and we thought that it was a case of deficient constitution. In another case in another operation for cataract in which the vision was almost perfect the author did not want to make the dissection of the capsular cataract that remained because the other eye was non-operable, and the case became impatient, went to another colleague and lost the eye from glaucoma. On that account he is afraid of the dissection when there is one eye that sees and another that does not and he believes those accidents to be due to distension of the ciliary body and zonula of Zinn. He makes the dissection with a thin Graefe knife.

DR. BLANCO is of the same opinion as Dr. Menacho in reference to the lost cases, but Dr. Menacho's cases were not really failures because he had fulfilled all that was to be done. He uses mydriasis very often and thinks that arthritis has something to do with these cases.

DR. WIEDEN (SENIOR) believes the failures due to distension of the zonule of Zinn.

DR. LAOZ ratified the opinion of Menacho.

DR. MENACHO explained that he had done the dissection with the fine needle of Galezowski and he could not explain the phenomenon but will not change his procedure for the future.

DR. SANTOS FERNANDEZ made a very short abstract of his paper about the *Progress of Ophthalmology in the present Century with reference to Spain and Latin America*; in which the author points out the evident advances made in Spain and in Latin America. Before that there was really no ophthalmology in those countries. This science really came to its own when there were established special papers and professorships.

DR. SANTOS FERNANDEZ read his paper on *Some Cases of Extreme Photophobia*. He pointed out the fact that most cases are due to not following the doctor's directions, that they are numerous and some due to the direct action of the sun on the cones of the retina or to some external affection that irritates the rods and cones.

DR. FIGUERAS BARÉS, from Barcelona, read a paper entitled "Contribution to the Treatment of the Disturbances of the

Lachrymal Ducts and a New Treatment to Cure Chronic Dacryocystitis without the Excision of the Punctae," a very interesting work that has a conservative view and that agrees with the present way of thinking. The paper has some slight mistakes or omissions but should be applauded because it means a progress in the treatment of the diseases of the lachrymal ducts that are so frequent in Spain. This shows that although some evil wishers of Spain say that Africa's boundaries begin at the Pyrenees we were right in what we said at the Anthropological Society of Havana many years ago and again at the XIII International Congress of Ophthalmology held at Madrid in 1903; in that anthropological essay we stated that from our own investigations we were sure that the osseous canal was wider in the negro and mulatto than in the whites.

In Madrid dacryocystitis cases abound, being more frequent than in Paris where they are also frequent, and in this trip to Spain we have ascertained that wherever ophthalmology has gained in the far away places there are less cases of loss of sight.

DISCUSSION.

DR. CASTROVIEJO discussed some of the mistakes incurred by the author as when the author says that it is impossible to syringe the sac and duct with Anel's syringe, when since the time of Adam there exists an instrument that enables the distension of the lachrymal punctae without cutting them.

DR. WIEDEN recommends some medicaments, like zinc sulphate, to avoid or delay the excision of the lachrymal sac.

DRS. AGUILAR AND TUTO complain that it is impossible to speak about all the different parts of the lachrymal apparatus *in toto*, when each one of them needs a different procedure.

DR. WIEDEN mentions the use of Iodine in these affections and the precautions required.

DR. LEOZ ORTIN, from Madrid, read a paper entitled, "Foreign Body of Large Size Imbedded in the Floor of the Orbit without the Patient Knowing it and that was Discovered on Removing a Papilloma of the Cornea." In this paper the author mentions that he does not wonder at the large size of the foreign body that was placed near the entrance of the optic nerve, being about the size of half a cigarette, but what is wonderful is that the patient although becoming blind in that eye did not remember to have had the traumatism until the foreign body was shown to him.

In the *discussion*, Drs. AGUILAR and VIDAL mentioned also some cases of curious foreign bodies in the eye.

Dr. SANTOS FERNANDEZ said that in only a few countries do the farmers have an alert mind and that the dullness of the routine work may explain the phenomenon.

Dr. WIEDEN, VINARTA, JUNIOR, read a paper entitled "Total Restoration of the Orbital Cavity by means of Skin Grafting in order to obtain Ocular Prothesis."

THIRD SESSION—SEPTEMBER 22ND, FRIDAY.

Dr. PALOMAR DE LA TORRE, from Zaragoza, in the chair. He opened the session and called Dr. JAIME GONZALEZ to take the chair. This fine old gentleman was accompanied to the chair by Dr. Castaner and surprised everybody by his vigorous mind in spite of his advanced age—84 years. Dr. Gonzalez expressed himself in favor of the modern advances of ophthalmology especially in the prophylaxis of Trachoma, a thing that he has been fighting for since 1850. He believes that Trachoma is very much extended in Valence and in all Spain and recommends that all the ophthalmologists should do all they can to help eradicate the disease.

Dr. CASTANER discussed the medical treatment of cataract. Dr. TOMAS BLANCO has not obtained true improvements but has been able to retard the growth when the treatment was begun early and the case was patient. Dr. CARALT, from Barcelona, believes in ionization and has obtained some advantages because the potassium iodide goes into the eye and the iodic acid that is very irritating, goes out. Dr. MARQUEZ believes that the medical treatment has given poor results but that new experiments that are being carried out, also by him, may give some results. One should not expect the disappearance of the lens as in aphakic eyes, but the clearing up of the lens.

Dr. WIEDEN, SENIOR, described two cases undergoing treatment by potassium iodide and illustrated on the board how the lens is clearing of the opacities.

Dr. SANTOS FERNANDEZ has obtained the same results as Dr. Blanco and believes that it is of value to delay the advance of cataract in one eye while the other eye is operated. This also gives the advantage of having the patient more trustful.

Dr. SANTOS FERNANDEZ read his paper entitled "*Can Trachoma be Cured?*" and said that being a disease known

since Pliny, Cicero and other famous men, trachoma still offers grave doubts about its diagnosis, because in spite of the repeated laboratory experiments, it has not been possible to make an exact diagnosis like in gonorrhoea and diphtheria. The difficulties of the diagnosis are seen after one establishes the treatment. Among our old cases there is one of a lady seen by us 40 years ago in Cuba and that we have seen again on this trip to Spain: she is well but not cured of her trachoma.

DR. PALOMAR DE LA TORRE believes that trachoma can be cured and gives his views from over 600 children that were treated by him.

DR. MOLTO, from Valence, states that in his opinion trachoma can be cured even without hygiene, this being the first thing that is recommended and we have had proof of this in a case in which the cornea did not become affected.

DR. VIDAL FRAXANET thinks that trachoma can be cured if seen at the beginning of the disease and when treated continuously for a long time. As this is hard to obtain he says rightly that trachoma can not be cured.

DR. SANTOS FERNANDEZ read a paper by DR. JESUS M. PENICHER, from Havana, entitled *Contribution to the General Study of Trachoma in Cuba*, that was well received.

DR. FIGUERAS PARIS, from Barcelona, says that trachoma can be cured but needs the good will of the surgeon and of the patient, the last one rarely gives it on account of ignorance or poverty, because trachoma is the patrimony of the poor.

DR. MARQUEZ holds that it can be cured with the means at hand and the drugs, but that it is hard to do it because of the class of people that suffer from it.

DR. WIEDEN VINARTA states that it is necessary to follow the evolution of Trachoma in order to apply the treatment as soon as possible because when it becomes advanced it is hard to cure.

DR. CARALT says that it pains him to combat the opinions of his teacher, Dr. Santos Fernandez, but he believes that trachoma can be cured by means that are not sometimes easy, as a lady who on becoming a mother was cured from her trachoma.

DR. MESTRE agrees that trachoma is a very grave disease and often tenacious and has observed that in the high altitudes it can be cured easily, as in some places in Valence 200 meters higher than the sea level.

DR. PALOMAR DE LA TORRE says that in the Asylum each child should have his own basin.

DR. SANTOS FERNANDEZ in regard to the influences high altitudes have on trachoma stated that in 1885 and 1886 DR. CHIVRET in a paper read before the French Ophthalmological Society mentioned that fact and that Dr. Santos Fernandez at that time pointed out the fact that the negroes did not have the disease as often as the whites. It can not be said that there is no trachoma in the high places but if there is it is more benign than elsewhere. The negroes live more in the open, contrary to the habits of the Egyptians.

DR. BLANCO said that climate influences the disease, thus in Finland there are no cases of trachoma. Cleanliness is the first necessity to combat trachoma successfully. There are in Spain many places where there is absence of running water and Dr. Blanco urged the Society to ask the government to end that state of things.

DR. Blanco was applauded heartily and DR. SANTOS FERNANDEZ moved that the Society act. The motion was seconded and carried and a committee was appointed composed of Drs. J. Santos Fernandez, Dr. Blanco and the Secretary.

DR. SANTOS FERNANDEZ said that in regard to the Finns he could add that although they did not suffer from trachoma in their own country, they were nevertheless among the most extensive propagators of the disease in the United States, on account of their poor accommodations and lack of cleanliness.

DR. CARALT, from Barcelona, read a paper about the "Morphology, Pathology and Treatment of Scleritis"; a very extensive work impossible to review in a few pages. We believe however that Dr. Caralt has been ingenious in selecting this subject which in our opinion is one that needs immediate revision.

DR. BENAVIDES speaking of the nature of scleritis said that he considered it to be specific hereditary and that he had observed about twenty cases. Dr. Caralt agreed.

DR. FIGUERAS PARLÉ described a case of gonorrheal ophthalmia in a child whose mother did not have gonorrhea.

DR. SANTOS FERNANDEZ read a paper by DR. FRANCISCO M. FERNANDEZ, from Havana, concerning the "*Ocular invasions of the gonococcus and its toxins*" in which he demonstrated that the toxins produce the disease, and showed the way to prevent

and to combat the disease, mentioning also the investigations of DR. DEHOGUES, from Havana.

DR. TUTO read a paper on the "Operation of Infantile Cataract at this Moment" in which he justifies operation in two steps by means of the extraction.

DR. SANTOS FERNANDEZ said that in spite of the good results of Dr. Tutó practicing the extraction of cataract in children, as recommended by SMITH and in some cases PROFESSOR PANAS, he believes it to be a subject of conscience to recommend that the congenital cataract should never be operated that way. He has had some failures and his experiences give him the right to say very loud that it is almost a crime to make the extraction in a child when we have the needling operation that can be so frequently repeated and is so sure. The surgeon should do only what he knows is right for the patient and should never allow himself to be influenced against his wishes by the desires of the parents.

DR. BLANCO agreed with DR. SANTOS FERNANDEZ.

FOURTH SESSION—SEPTEMBER 23D, SATURDAY.

DR. MARQUEZ in the chair. DR. FRANCISCO POYALES, from Madrid, read his paper on *Strabismus of the Newly Born*, in which he explains his investigations in the laboratory and also the congenital convergent strabismus. He believes the infantile hyperopia to be a cause of the squint. He also studies the lack of development of the central nervous system. He believes that the squint is due to an absolute predominance of the myotone originated from the internal rectus over that of the external rectus.

DR. SANTOS FERNANDEZ said that in a recent work of DR. PARINAUD, from Paris, there is a subject similar to that described by Dr. Poyales. Parinaud believes the congenital strabismus due to partial cured meningitis. DR. BLANCO said that the strabismus mentioned is due to hypermetropia because the accommodation tends to convergence.

DR. SANTOS FERNANDEZ read the paper of DR. CARLOS E. FINLAY, from Havana, and DR. DEHOGUES. DR. FINLAY'S paper was on "*Paralysis of the Third Cranial Nerve from Ethmoiditis*."

DR. WIEDEN presented a case of typical trachoma with pannus, that has been made much better, the pannus having

partially disappeared, leaving a state of keratoconus in both eyes.

DR. MOLTO read a paper on *Ocular Syphilis*, with diagnosis and treatment. The case was discussed by Drs. BLANCO and BENAVIDES.

DR. SANTOS FERNANDEZ read a paper on *Non-specific lesions of the Eye Cured by Mercury*.

DR. CARALT read a paper on the *Ocular Syndrome of Mongolism*.

DR. TUTO presented a case of traumatism of the left eye with consequent paralysis of the right external rectus.

DR. FIGUERAS spoke about the popular prejudices against the wearing of glasses, and Dr. Marquez said that it is necessary to combat them also in some well-to-do people. He condemns the conduct of some opticians who only should sell the prescription instead of ordering glasses.

DR. MARQUEZ described a case of *Ocular Paludism* which was discussed by Drs. J. SANTOS FERNANDEZ, AGUILAR, MOLTO and GONZALEZ CASTELLANOS.

DR. LEOZ described a case of amblyopia by saturnism.

DR. WIEDEN mentioned a case of foreign body extracted by the magnet.

DR. BLANCO showed a case of Osteoma of the Orbit.

The sessions were finished with the appointment of *Honorary President* made in favor of Dr. JUAN SANTOS FERNANDEZ, and the appointment of the *Executive Committee*, Drs. WIEDEN, PORTILLO and MOLTO. DR. GONZALEZ CASTELLANOS was appointed *Honorary Member*.

The next Congress will be held at Madrid on November 1918.

COLORADO OPHTHALMOLOGICAL SOCIETY.

E. M. MARBOURG, M. D., PRESIDING.

Colorado Springs.

OCTOBER 21st, 1916.

Proptosis Due to Sinus Disease.

Dr. B. A. Filmer presented a patient, Mr. M., age 49. First seen April 12th, 1916. Right proptosis past four weeks. More or less conjunctivitis, asthenopia and edema. Pupil slightly smaller than the left and regularly dilates two-thirds

under homatropine. Several X-ray pictures all negative. Takes cold easily. Nasal septum deflected to the right. July 7th, corneal ulcer at junction of middle and lower third. Had submucous resection, as the deflected septum was pressing heavily against the middle turbinate. The anterior and posterior ethmoidal cells and sphenoidal sinus were opened. His physician obtained negative results from the use of thyroid extract and potassium iodide.

V. O. D. 20/120+1; V. O. S. 20/40+1. With correction O. D. $-0.50 \text{ C} + 1.25 \text{ cyl. ax. } 75 = 20/50$. O. S. $+0.25 \text{ C} + 0.75 \text{ cyl. ax. } 120 = 20/20$. A +2.00 sphere was added for the near point. He has exophoria $11\frac{1}{2}^\circ$ and left hyperphoria 2° . The fundus showed the veins full and tortuous in each eye and the right cornea hazy. October 21st, V. O. D. 20/80—1: with correction 20/60—1. V. O. S. 20/60—3; with correction 20/40—2.

DISCUSSION.

Dr. Wm. C. Bane thought the fundi were negative by the indirect method, but said the conjunctival vessels were unusually large.

Dr. E. R. Neeper said this case had been presented by his associate, Dr. Filmer, and himself because of unusual symptoms and the doubtful etiology. The inflammation in the eyes was much less immediately after the nasal operation.

Dr. J. A. Patterson thinks the X-ray was misleading, as the posterior ethmoidal cells were formerly involved. He saw the case a few months ago and thought there was exophthalmus of each eye, more pronounced in the right. The nerve heads were negative, but the eyes were limited in movement.

Dr. W. A. Sedwick believes the accessory sinus disease is the cause of the eye disease.

Dr. Neeper presented three cases as follows:

Embolus of Central Artery.

1. Miss W. Age 17. O. D. suddenly became blind while combing her hair, 7:40 A. M., September 13th, 1916, and has remained blind. Circulatory changes were apparent when first seen three hours later. Macular changes have developed in the meanwhile. She was examined by Dr. W. L. Bortree and the following is his report:

F. H. Father, mother, two sisters and two brothers living and well. Mother had two miscarriages following birth of patient. Cause unknown. Two younger children well.

P. H. Scarlet fever at 4, a light case, physician not called and no sequelae. Measles at 6, whooping cough at 8, mumps at 8; all light cases and no complications or sequelae.

P. I. September 13th, 1916 at 7:40 A. M., while combing her hair, she became blind in the right eye. No pain. A sensation of "jerking behind the eye" was the only sensation. Was feeling well at the time.

P. E. Well developed and well nourished girl. Skin and mucous membranes of good color; teeth in good condition. No cavities, no pyorrhoea. Throat clear; tonsils small and buried. Nose negative. Right lobe of thyroid slightly enlarged. No thrill, pulsation or bruit. No tracheal tug.

Lungs: No dullness, rales or altered breathing. Expansion equal and good.

Heart: Slight enlargement to the left, apex impulse very strong in fifth interspace to left of nipple line. Heart sounds clear, no murmur. Second sounds at base louder than normal, sharp in character, aortic louder than pulmonic.

Abdomen negative. Reflexes negative.

Blood pressure, Tycos: Systolic 140; Diastolic, 92. Pulse pressure 58. The internist does not know the cause of high arterial tension.

Menstruation regular, scanty, not painful. Began at 13.

Habits: One cup of tea and two of weak coffee daily. Little sweets. Sleeps seven to eight and one-half hours per day. Bowels regular. Sleep, appetite and digestion good. No cough, pain or dyspnoea. Present weight 108, the maximum.

Urine: Twenty-four hour quantity one and one-half pints. Clear, amber, acid, no sediment. Specific gravity 1024. Total solids 42 grams. Urates increased. No albumin, sugar, acetone or diacetic acid. Indican moderately increased. Sediment shows many calcium oxalate crystals and squamous cells. No casts, blood or pus.

Blood: Haemoglobin 98% Dare. (Should be 115%.) Red cells 4,216,000. White cells 5,800. Red cells normal in size, shape and color. No parasites. Blood platelets negative. Polynuclears 72%. Lymphocytes 11%. Small mononuclears 13%. Large mononuclears 2%. Eosinophiles 2%.

DISCUSSION.

Dr. A. C. Magruder has had a similar case in an older woman and saw Dr. Neeper's case about six hours after the

embolism. He gave massage, large doses of salts, etc., all without benefit. Serious prognosis. Dr. Neeper used amyl-nitrite.

Dr. Otis Orendorff asked if this disease usually occurs in women? He had a case in a ranchman's wife with a cilio-retinal vessel, which gave for a time a better prognosis. She could only see shadows in field of the cilio-retinal vessel. He used dionin subconjunctivally, but without permanent improvement.

Dr. Neeper asked how many have seen this disease in young adults or childhood? Dr. Marbourg has, but Dr. Jackson hasn't. Dr. Jackson thinks this patient may have a thrombus, and not an embolus.

Dr. F. E. Wallace asked if pulmonary tuberculosis might be a cause? Dr. F. R. Spencer said the prognosis is good for the left eye, as the bilateral involvement is unusual. Dr. Jackson stated that there are very few bilateral cases in the literature. He referred to Harbridge's case of spasm and salts were used to give relief. He thinks Dr. Neeper's case was one of spasm at first and thrombus later.

Dr. Wm. H. Crisp stated that it is the general experience that blood doesn't clot readily in any part of the eye, so why should it clot so quickly in the central vessels. He also believes the vessel is at first rough and the clot forms later. Dr. H. M. Thompson thinks a toxic condition precedes the clot.

Spasm of Retinal Vessels.

Dr. Neeper reported another case in which spasm has involved the upper field. This dates back three years. Attacks are occurring oftener. There are three impacted third molars. He wonders if impaction reflexly produces spasm of the retinal vessels. He is studying this case and X-rays have been taken. He may advise extraction of the impacted teeth. There is complete blindness, one hour at a time, in the upper field.

DISCUSSION.

Dr. Crisp asked if this is a scintillating scotoma? He thinks this may explain the case. Dr. Neeper replied in the negative.

Dr. Jackson related a case of impacted third molar with migraine, change in refraction and scintillating scotoma. Patient free from attacks now at the age of 24.

Stellate Cataracts.

2. Miss G. Age 21. First seen August 8th, 1916. Six

years ago, while in school, after an eye examination, the school nurse advised others to get glasses, but said nothing to her about getting them. In the past six months, vision has become so poor she no longer enjoys the movies.

V. O. D. 20/200; V. O. S. 20/200+1, not improved by lenses.

These are unusual stellate cataracts. This patient may require needling later, as the opaque striae, in the lenses, are rather broad and her vision is poor.

3. Mr. C. Age 21. Healthy. Vision always poor. V. O. D. 20/60+3, with a $-2.25\text{C}+3.50$ cyl. ax. 110=20/30-2. V. O. S. 20/80-1 with a $-2.50\text{C}+4.50$ cyl. ax. 90=20/50+. This is a second case of unusual stellate cataracts and will not require operative interference soon, as he has reasonably good vision with his correcting lenses.

Neuroretinitis Due to Sinus Disease.

Dr. E. E. McKeown presented a case as follows:

H. W. Age 24. General health fine. Three years ago had iritis, which lasted several weeks. After this lenses were ordered, which gave him 20/20 vision each eye. About six months ago he drove through a blinding snow storm for two hours; following this there was quite marked irritation of the lids.

Two weeks ago vision suddenly failed, leaving only light perception. Dr. Jackson, of Salida, treated him with mercury and iodide. The Wassermann and urine were negative. Was unable to take the fields.

Examination first showed a hazy vitreous, but this seems to have cleared up somewhat. The vessels were tortuous, especially in the superior part. The disc was not clearly outlined.

DISCUSSION.

Dr. Wm. C. Bane found interference with return circulation and a hemorrhage below. The disc was hazy and the vessels tortuous. There was a hemorrhage of the macula from unknown cause.

Dr. Jackson suggested venous thrombosis, possibly from accessory sinus disease. He also suggested that the exophthalmus be measured. Dr. Spencer suggested retinal tuberculosis, but said he believed the accessory sinus disease more probable.

Dr. J. A. Patterson presented two cases and reported another as follows:

Interstitial Keratitis Due to Acquired Syphilis.

1. Mrs. M., widow, age 20. Employed at laundry. On October 14th there was a sensation of a foreign body in O. S. When first seen October 18th, there was a marked point of congestion at the limbus up and in, with interstitial keratitis running from this point toward the center; aqueous slightly turbid. Pupil dilated widely, except below, under atropine. There were no synechiae. Hot stupes aggravated the condition.

She suffered a relapse last night with pain; the iris was inclined to adhere below, but the pupil dilated readily.

The upper and lower first molars were decayed. The first upper left molar showed evidence of Riggs's disease.

Dr. Patterson stated that the patient is a grass widow and he wanted the opinion of the society regarding the etiology of the case; he believes it is luetic. He has used aspirin, salts, grey powder, etc. He wanted to have a Wassermann made, but the patient couldn't afford it.

DISCUSSION.

Dr. Thompson suggested a return to potassium iodide and mercury.

Dr. Jackson thought it might be due to tuberculosis.

Dr. Orendorff pushed sodium salicylate in a similar case of mild rheumatism and the patient responded well to treatment.

Dr. Neeper thinks these cases are hard to classify, but they usually get well after a long time. He gives a mixed treatment.

Dr. Spencer suggested that the luetin and Von Pirquet tests be given, as poor patients often can't afford a Wassermann.

Dr. Magruder compared Dr. Patterson's first case to that of a girl with keratitis of a moon shape, which he reported before this society at the January 1916 meeting, which was held in Colorado Springs. In this case Descemet's membrane was steamy.

Dr. H. R. Stilwill thinks the patient would give a positive Wassermann.

Glaucoma.

2. Mr. B., age 47, negro. Came complaining of presbyopia. Admitted O. S. had been blind for some years, having gradually become so without pain. Has never consulted an oculist.

V. O. D. $\frac{6}{5}$ and V. O. S. not even light perception.

Ophthalmoscopic examination revealed, O. D., a peculiar coil of large veins at nasal edge of disc. The nerve looks atrophic. He had a full candle field. O. S. Typically glaucomatous excavation to periphery. Tonometer: O. D. 60 and O. S. 45. Under pilocarpine: O. D. 40 and O. S. 45.

DISCUSSION.

Dr. Jackson thinks the most interesting feature of this case is the coil of vessels anterior to the disc and projecting forward from the disc. This looks something like a naevus. Dr. Crisp expressed the same opinion.

Tuberculous Ulcer of Conjunctiva.

Dr. Patterson reported a case of tuberculosis of the conjunctiva with a beautiful water color picture painted by Miss Leaming. The patient being bedridden, he was unable to present her in person.

Mrs. F., age 57, was seen on July 29th, 1916. She came here for pulmonary tuberculosis, but did not consult a physician until she had spent five days walking around and was compelled to go to bed and call one.

The patient gives a history of having had tuberculosis two years previous to a relapse, which began in June 1914, having been induced by an attack of influenza, then prevalent as an epidemic. On August 5th, 1915 she became an inmate of the State Sanitarium for Tuberculosis of Iowa. She returned to her home in Iowa, February 5th, 1916, where she endeavored to continue out of door treatment.

Dr. W. H. Swan, through whose courtesy I saw the case, found the patient dropsical, which had been noticed for seven weeks. The urine showing albumen and blood casts. He tells me there is rather extensive tuberculosis infiltration in the left lung, the right lung is involved, but to a less degree. The patient has had marked elevation in temperature for many weeks.

Upon everting the lid of the right eye I found a large round ulcer 3 mm. from the edge and another of linear shape below and slightly outward from the first, located exactly upon the fold of the everted lid. The round ulcer had deep undermined edges, the center being grey and somewhat speckled. The center was depressed giving a slightly umbilicated appearance. The linear shaped ulcer was narrow, with equally steep undermined edges, the center being the same grey color. A small quantity of muco-pus was daily secreted and would accumulate

at the inner canthus, as shown in the picture. The patient removed this with her handkerchief many times during the day. The bulbar conjunctiva has shown barely any congestion, nor has there been much congestion surrounding the ulcers. No involvement of the lymphatic glands could be found in the facial or cervical regions. The larynx was free from tuberculous invasion, but there was some catarrhal condition in both the larynx and trachea.

The patient first noticed that the eye was uncomfortable last March. The two ulcers were noticed by her medical attendant before she came here. A collyria of boracic acid has been the only treatment prescribed.

On August 3rd both of the ulcers were thoroughly curetted and cauterized with a saturated solution of tri-chloroacetic acid. This was done very cautiously, but deeply. A strong solution of bicarbonate of sodium was immediately used around the ulcer, so that no excess could do damage to the normal tissue. The result has been an absolute cure, though the scars of the original ulcers can still be distinctly seen. The mucopurulent secretion, which was present, immediately ceased.

DISCUSSION.

Dr. W. F. Matson spoke of a case similar to a sty, but with the abscess on the sclera. The patient was from the National Jewish Hospital in Denver. He curetted this almost to the choroid. Tuberculous meningitis developed followed by death.

Dr. Jackson thought Dr. Patterson's case was one of undoubted tuberculosis of the lid. He referred to a case with negative Von Pirquet, etc., who developed tuberculous meningitis. The patient was operated upon in Arizona for a tumor and recovered. He is now living in Arizona. The sclera was first involved in each eye similar to Dr. Matson's case.

Pathological Eye Specimen.

Dr. A. C. Magruder presented a pathological specimen; an eye which was injured by a scissors cut at 4 years of age, and enucleated at the age of 18, because of pain and lowered vision in the right eye. Dr. Jackson suggested that this be sectioned by Dr. Wm. C. Finoff.

Eye Injury.

Dr. Magruder reported a case of a boy who had been struck in the eye by a harness buckle. The eye had been blind for years. Patient has been in the Kansas City clinics.

Hyphaemia was present. The eye was cocainized and the anterior chamber opened and irrigated to remove the blood. Aqueous and blood came out through the irrigating wound. The pupil could be seen a few days later.

Luetic Ocular Paralysis.

Dr. Magruder reported a case of a man struck in the left mastoid. Blood came from the ear and the patient had diplopia. The railroad surgeon thought of a basal fracture. He was first examined by Dr. Magruder two months after the injury. An X-ray eliminated a basal fracture. The membrana tympani had been ruptured, as was evidenced by a scar. Patient had high esophoria. Patellar reflexes were absent. The blood Wassermann was negative. The patient refused a spinal fluid Wassermann. Patient had vertigo and one eye had to be covered to avoid vertigo and diplopia. Lues was suspected. Patient was given potassium iodide and mercury. He showed great improvement and was able to work after a few weeks of vigorous treatment.

Dr. E. M. Marbourg presented four cases as follows:

Cryptophthalmos.

1. A girl from the blind school with cryptophthalmos. The mother and one brother have the same condition. This child has been operated upon twice. She has good light perception.

Microphthalmos.

2. A case of microphthalmos with posterior polar cataracts and nystagmus.

Pseudoglioma.

3. A deaf mute with congenital cataracts since two years of age following an attack of cerebrospinal meningitis. The left eye is negative.

DISCUSSION.

Dr. Jackson thinks this patient had pseudoglioma, vitreous opacities, retinal detachment and degeneration of the eye.

Sarcoma of the Choroid.

4. A case of retinal detachment best seen with a +12—20 D. lens. Dr. Jackson stated there was pigmentation in an arc up and forward. The choroidal vessels were very evident. This looks like a flat sarcoma, but there may have been some other process in the choroid. Transillumination is very difficult, as this is too far back for transillumination.

The sarcoma may be pushing the retina forward. This case is one of unusual detachment and should be watched.

DISCUSSION.

Dr. Wm. C. Bane thought the retinal detachment not grey enough and too smooth for a serous detachment. He thinks this is suggestive of a sarcoma.

Exophthalmometer.

Dr. F. R. Spencer presented a Bausch and Lomb exophthalmometer for inspection. This is a modification of Prof. Hertel's original model. With this instrument the exophthalmos can be read easily.

FRANK R. SPENCER, Secretary.

Boulder, Colorado.

THE PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

DR. WM. ZENTMAYER, CHAIRMAN.

APRIL 13, 1916.

Symposium on "Diseases of the Lachrymal Organs."

"The Anatomy and Physiology of the Lachrymal Apparatus."

Dr. W. W. Watson gave a brief review, referring especially to those anatomically predisposing factors that particularly lend to the development of obstruction in the lachrymal passage.

"The Etiology of Stillicidium."

Dr. Wm. Zentmayer said that epiphora occurs when, either as the result of over-stimulation of the lachrymal secretory apparatus the flow of tears is in excess of the capacity of the drainage apparatus, or where with normal or abnormal stimulation there is some abnormality of the lids or of the lachrymal passage.

Over stimulation may be either reflex or central. Psychical weeping is of central origin. Dr. J. C. Carpenter recorded a case of epiphora which was apparently due to an irritative central lesion of specific origin. The epiphora met with in exophthalmus, tabes, syringomyelia, pregnancy, and migraine is probably reflex in origin; while that due to corneal and conjunctival irritation as is seen in foreign bodies and phlyctenular disease, also in refraction errors, as well as that occasionally met with in cataract, as pointed out by de Schweinitz, is

typically reflex, in the latter instance probably, as de Schweinitz says, the result of the uveal disturbance which according to Risley is so frequently a causative factor in the production of cataract. Epiphora occurs when as the result of facial palsy winking is in abeyance or the lids are no longer in close relation with the globe, or where they fall away from the globe from loss of muscular tone in senility, or are drawn away by cicatrices in the neighborhood of the lids, or as the result of chronic inflammation of the skin of the lids, lid margins, conjunctiva or as pointed out by Dewey, by mal-adjustment of nose glasses of the "sure-on" type. Epiphora also occurs when there is obstruction in the lachrymal passages. This may be congenital or acquired. Congenital types are, absence of the puncta or canaliculi and atresia in the canal, usually at the lower third, or more frequently non-patency of the nasal end (Hasner's Valve). Acquired obstruction to the nasal passages arises from foreign bodies such as cilia, and fungoid growths as leptothrix, streptothrix, penicillium and actinomyces, or it may arise from burns or wounds, or from intranasal disease. Dr. Zentmayer then considered stenosis of the lachrymal duct, dacryocystitis acute and chronic, and mucocoele.

"The Conservative Treatment."

Dr. Samuel D. Risley (by invitation) in discussing the nature and management of affections of the lachrymal drainage system urges the importance and relative value of conservative treatment. He regarded the reputation for chronicity of these affections as due in large measure to the violent methods of treatment to which they are often subjected. He was led to adopt this view by a study of the anatomical character of the nasal duct in a large number of skulls and wet preparations. The irregular surface of the bony duct, even in dried preparations, made it quite impossible to pass the large-sized probes which had been employed by some surgeons in any of the skulls examined without fracture of some portion of the projecting walls of the duct, and in two specimens not even the smaller probes could be passed without injury. After these studies he lost the idea that the nasal duct was a drainage *tube* like a drain pipe. A more correct conception is that of an irregular fissure or slot-like passage for the tears, lined by mucous membrane. He pointed out that this mucous membrane duct is surrounded by a system of veins in health, like cavernous or erectile tissue,

which when congested from any cause must compress the mucous duct and close its lumen more or less completely in any portions of its irregular surface, and in this manner cause a retention of tears. Dr. Risley said that this retention was a common experience in acute coryza and other systemic states causing oedema of the mucous membrane; *e. g.*, auto-toxemias, common "colds," etc. These considerations had many years ago led to the adoption of more conservative methods in the treatment of lachrymal obstruction, and clinical experience had soon demonstrated its greater value. The habitual employment of probes was soon abandoned and he has been able to give a more favorable prognosis. The discouraging cases were those who had been subjected to injury from forcible introduction of probes. If, in the attempt to force a probe down to the floor of the nostril back of the inferior turbinate bone, the mucous membrane had been torn through and its surrounding congeries of blood vessels injured, the prospect of a permanent cure was remote. Dr. Risley thought that permanent strictures of the duct were likely to occur after such an accident, and the chronic cases of purulent and muco-purulent dacryo-cystitis liable as a sequel.

Dr. Risley's method in acute cases was, after the installation of cocaine, to dilate the inferior punctum and canaliculus with a dilator, which he had devised, and then with the fine canula of his lachrymal syringe irrigate the sac with an alkaline unirritating lotion. If the lotion passed through the nasal duct, the prospect of speedy recovery was good. If the lotion returned through the canaliculi into the conjunctival sac, a few drops of a solution of cocaine and adrenalin were carried into the sac and allowed to remain for ten minutes, and a second trial made to force the solution through the nasal duct. Failing in this, an alkaline astringent wash was prescribed to be instilled into the conjunctival sac at intervals until the following day. The attempt to irrigate the duct was then repeated and was usually successful. If not, after thorough cocainization a cautious attempt was made to pass a No. 3 or No. 4 of the Bowman's series of probes, or a fine silver probe with a small bulbous extremity. If successful in this attempt, irrigation followed and the case recovered, often without any subsequent resort to probing. In long standing cases he had found that frequent irrigation with a wine-colored solution of iodine

was sufficient in sterilizing the sac and duct and through its stimulation to restore the parts to health. He recalled the former years when the clinic brought many cases daily who sat with Bowman's probes in their tear ducts, but said that now a visit to his clinic would never discover a single example, and only rarely the temporary passage of a probe.

"Operations for the Removal of the Sac."

Dr. Wm. Campbell Posey gave the details regarding the indications and method for the removal of the lachrymal sac. He said without complete local anesthesia removal of the sac in toto was extremely difficult if not impossible. He injected the region about the sac freely with nine parts of a 2% solution of novocaine and 1 part of a solution of 1 to 3000 of adrenalin.

Dr. Posey advocated Meller's method, but said that he did not think this operator laid sufficient stress on the palpebral ligament as a land mark for the location of the sac. Finding the teeth of the Meller speculum liable to cause injury to the cornea in the event of the instrument slipping, he had substituted blunt hooks. In order to avoid leaving any suppurating mucous membrane, Dr. Posey advised the slitting up of the canaliculus and the thorough curetting of the mucous membrane lining the tube in every instance. He had seen a disfiguring scar from the operation in only one instance out of the 75 or more removals of the sac he had performed. This was due to a keloid overgrowth of the lips of the wound.

While the obliteration of the sac permanently closes the lachrymal passage, the chief source of lachrymation in the case of lachrymal disease, *i. e.*, the irritation of the mucous membrane by the retained muco-purulent discharges is removed, so the lachrymation is slight and patients are usually grateful for the relief afforded.

Dr. Posey recommended the removal of the sac in all cases of mucocoele, in all long standing inflammations of the mucous membranes of the sac and in all cases of lachrymal stricture where styles failed to give permanent relief.

WALTER W. WATSON, Secretary.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 30 North Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. W. W. Sauer of Marietta, Ohio, has been ill with erysipelas.

Dr. Cassius D. Westcott of Chicago spent the month of November in Northern Michigan.

J. Hilliard of Blackpool, Eng., has received the appointment of Eye Specialist at the Port of Omara on the Persian Gulf.

Drs. Paul J. Sartain and McCluney Radcliffe have been appointed governors of the Physicians' Club of Philadelphia.

Dr. Walter Baer Weidler of New York City has been appointed a member of the New York state commission for the prevention of blindness.

The Southern Medical Association met in Atlanta, November 13 to 16. Dr. J. W. Jervey of Greenville, S. C., was chairman of the section of ophthalmology and oto-laryngology.

Dr. M. Uribe-Troncoso, formerly of Mexico City, has located in New York City where he will continue the practice of ophthalmology.

The following deaths of ophthalmologists are announced: Dr. Edward H. Grannis of Menominee, Mich., aged 62. Dr. Harry Weynant of Philadelphia, aged 47. Dr. P. Lagleyze, professor of ophthalmology in the University of Buenos Ayres, aged 61.

The American Academy of Ophthalmology and Oto-Laryngology will meet in Memphis, December 11, 12 and 13. A special train will leave Chicago on December 9 to carry the members from that section.

E. C. Temple-Smith, D. O. (Oxon.) was recently appointed Honorary Ophthalmic Surgeon to St. Vincent's Hospital, Sydney, N. S. W.

The Royal London Ophthalmic Hospital Reports, the Ophthalmic Review, and the Ophthalmoscope will discontinue their publication on January 1, 1917. The field of these three publications will be occupied by a new journal to be known as the British Journal of Ophthalmology, under the editorship of Mr. Sydney Stephenson.

Mr. W. W. Wait recently died at his home in the city of New York. Mr. Wait was for many years instructor and principal in the New York Institute for the Education of the Blind. He invented the typewriter for the blind and the machine for embossing the N. Y. point print system on paper.

The National Board of Medical Examiners held examinations in Washington in October. Of 32 applicants 16 were accepted as qualified to take the examination. Ten attempted the examination and five passed. The next examination will be given in Washington in June, 1917. Information may be obtained from Dr. J. S. Rodman, 2016 Walnut St., Philadelphia.

Examinations will be given at Memphis during the coming meeting of the American Academy by the joint board of ophthalmic examiners representing the American Ophthalmological Society, the American Academy of Ophthalmology and Oto-Laryngology and the section on ophthalmology of the American Medical Association.

The Société d'Ophthalmologie de Paris has given special attention to the question of eye injuries resulting from the war. The principal recommendations made are that immediate cleansing treatment be instituted, that face and lid wounds be carefully sewed in apposition in order to avoid large granulating wounds and consequent deformity, and that enucleation be postponed until skilled attention can be given at base hospitals. The danger of sympathetic ophthalmia is not ignored but immediate enucleation is not deemed necessary.

Neisser, who at the age of twenty-four years discovered the gonococcus, is dead at the age of 61 years.

Dr. A. E. Prince of Springfield, Ills., will hold a clinic at his ho-pital on the afternoon of December 14, 1916, at an hour suitable to the arrival of the trains from the south. This will enable those returning from the Memphis meeting of the Academy to see the cases illustrating the mule-shoe drain for glaucoma, etc. Visiting ophthalmologists are invited to be the guests of Dr. Prince for luncheon and dinner.

WARNING.

As we understand that in many parts of the country unworthy agents are soliciting subscriptions and the renewal of old subscriptions for magazines, often promising the subscriber a large discount, we are obliged to advise our readers not to pay money to agents unknown in the community in which they work.

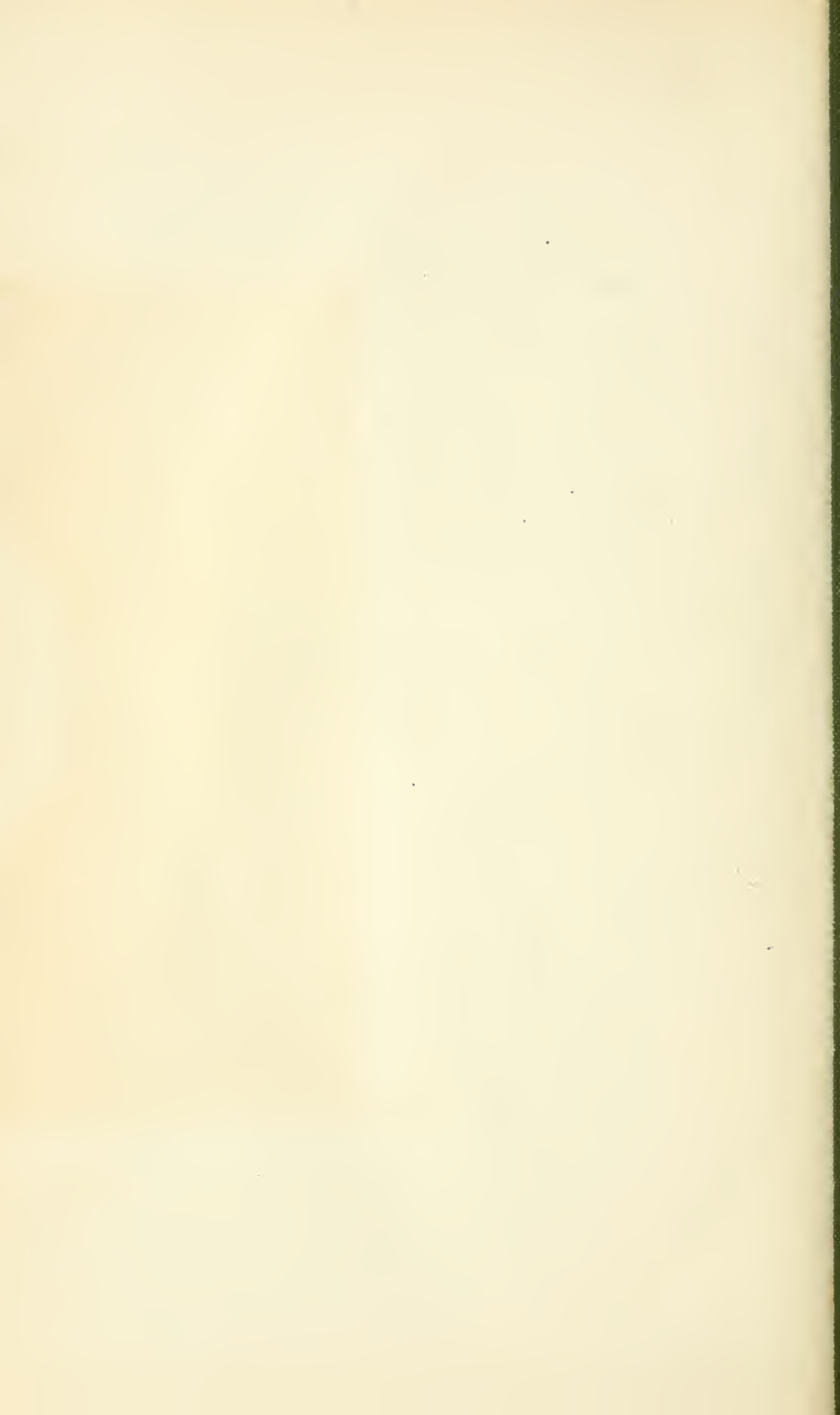
We regret that unworthy agents make this warning necessary as we have reason to know that there are many agents who are both honest and reliable. Subscribers are therefore urged to send their subscriptions directly to the OPHTHALMIC RECORD, 7 West Madison St., Chicago, or through agents of known standing.

BABY'S EYES ARE PRICELESS.

San Francisco, October 23.—The value of a baby's eyes was fixed at \$25,000 here today by Judge Frank J. Murasky in superior court, who gave judgment for that amount to the parents of Mary Rubio, one year old, against Mrs. Amalia Razuoli, a graduate midwife. It was alleged the midwife failed to care for the baby's eyes properly at birth and now the eyes are sightless.

"A pair of baby's eyes are priceless," said Judge Murasky. "No amount of money that this or any court could give, no matter how large the amount, would compensate for the loss of this baby's sight.

"Mary's father is a restaurant steward."—Duluth News-Tribune, October 24, 1916.



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